

CITY GOVERNMENT.

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AMERICAN WATER WORKS ASSOCIATION OFFICERS, 1898-9.

DETROIT'S STREET RAILWAY PROJECT.

It now seems that Detroit will be the first municipality in this country to undertake the ownership and operation of street railways. During the past month the McLeod bill, authorizing the city of Detroit "to construct, acquire, maintain and operate street railways, and to construct extensions thereof," passed the state legislature and received the approval of Gov. Pingree. The act is printed below, in full:

The People of the State of Michigan enact:

Section 1. That the common council of the city of Detroit be, and is hereby authorized and empowered to appoint by resolution at any time within the next twenty years, three persons, electors and freeholders of said city, who shall constitute a board of commissioners, to be known as the Detroit Street Railway Commission. One of said commissioners shall be appointed for the term of two years, one for a term of four years, and one for a term of six years. Their successors shall be persons of like qualifications, and shall be appointed by the common council on the nomination of the Mayor of said city at the expiration of said term for the term of six years. Vacancies shall be filled by appointment by the Mayor, and persons so appointed shall hold office for the unexpired term. All members of said commission shall hold their offices, respectively, until their successors are appointed and qualified. Any person otherwise eligible may be appointed as aforesaid, notwithstanding he may hold other office, excepting that of alderman.

Section 2. Said commissioners shall organize by the appointment of one of their number as president and one of their number as vice president. They shall appoint a secretary who shall keep a record of their proceedings. They shall fix his compensation and prescribe his duties.

Section 3. Before entering upon the duties of their office the said commissioners shall severally execute a bond to the city of Detroit, with one or more sureties, which shall be some responsible surety company or companies, in the penal sum of two hundred and fifty thousand dollars, and conditioned for the faithful performance of the duties of their office, which said bond shall be approved by the city controller and the corporation counsel of said city.

Section 4. The city treasurer shall be the treasurer of the moneys of said commission, and the same shall be credited to the commission, and shall be disbursed by warrant drawn upon the controller of said city, signed by the president and countersigned by the secretary of said commission. Upon the presentation of such warrant it shall be the duty of the controller to draw his warrant upon the city treasurer for the amount and in favor of the person named in the warrant of the commission.

Section 5. The said commission may in their discretion and upon such terms and conditions as they may deem advisable for the interests of said city acquire, by deed, lease or other satisfactory conveyance from the company or companies owning the same to said city, any street railway or railways existing at the time of the passage of this act and lying wholly within or partly within and partly without said city, operated by the same company or companies, together with the property, assets, rights, privileges, etc., owned and used in connection with or pertaining to said railways, including rights to routes belonging to such company or companies upon which a railway shall not be in operation, and may operate and maintain said street railways so acquired, for the carriage of passengers and freight for hire.

Section 6. Said commission may provide for the payment of rentals or other obligations and may provide for a sinking fund for the discharge of any liens upon any of the property acquired by them and may pledge the earnings and receipts of said railways for these purposes and may use the earnings in operating and maintaining the same, and may use any surplus of earnings in acquiring any bonds secured by

lien upon the property so acquired, or may use such surplus in making needed extensions or betterments to said railways. Said commission shall have no power to incur any obligation on behalf of said city except such as shall be chargeable only upon the railways and property so acquired and the earnings and increments and extensions thereof.

Section 7. The said commission shall manage, maintain and operate any street railway so acquired or extended, and may purchase from the revenue thereof, all lands, tracks, cars, motors, dynamos, machinery, equipment, tools and furniture necessary and useful therefor to be used in connection therewith, and may establish rates of fare for the carriage of passengers and freight, provided the rates of fare shall not exceed those now charged by the Detroit Citizens' Street Railway Company. In operating any railway so acquired, the commission may exercise such other general powers as are possessed or exercised by boards of directors of corporations organized under the laws of this State providing for incorporation of street railway companies.

Section 8. After acquiring any railway or railways pursuant to section five hereof, said commission shall have the power to enter into agreements with any street railway company having a line of street railway, for or in relation to the exchange of tickets and transfers, and for the carriage of passengers, use of tracks, or operation of cars, provided that such agreements shall not be inconsistent with or in violation of the terms of the conveyance or contract mentioned in section five hereof.

Section 9. The common council may examine the books, papers and accounts of said commission at any time, or cause the same to be done, and it shall be the duty of the city controller to make an examination of the books and vouchers of said commission every three months, and report the results of such examination to the common council. It shall be the duty of the commission to annually report to the common council, which report shall contain a complete and detailed statement of its receipts, and from what sources derived, and expenditures, and for what purposes made, and a detailed statement of the condition of the business and property under the management of said commission.

Section 10. Said commission may employ a director, and a manager, and such superintendents, attorneys, cashiers and other assistants and employees, and for such time and upon such terms and conditions and for such compensation as they may deem advisable. They may require security for the performance of the duties of any person so employed. They may make such rules and regulations relative to their meetings and proceedings, and for the government and conduct of their officers and employees, and for the regulation of the business as they may think best.

Section 11. All causes of action relating to or arising out of the owning, operating or control of any street railway constructed or acquired by said commission shall be prosecuted by or against said commission by the name herein designated and said commission shall carry into effect, pay or discharge any order, decree or judgment, in any suit or proceeding to which it shall be a party, in like manner as if the same were prosecuted or defended by said city: Provided, That no action for negligent injury arising out of the operation of said railways shall be maintained unless it be commenced within one year from the time when the injury was received, nor unless notice shall be given in writing within thirty days from the time of such injury to the said commission, its secretary or attorney, of the time, place and circumstances of such injury and of the nature thereof.

Section 12. Nothing in this act shall be construed as granting any franchise to any of the existing street railway companies, or as extending the life of any existing franchise, or as implying any franchise rights in case of reversion of the property to the grantors or their successors; and said commission is hereby expressly prohibited from granting or extending the life of any franchise under any of the powers conferred upon it by this act.

This act is ordered to take immediate effect.

On the evening of April 1, the common council of Detroit, by a vote of 21 to 11, adopted a resolution creating a commission to carry out the provisions of the McLeod bill, and naming Gov. Pingree, Carl E. Schmidt and Elliott G. Stevenson as the commissioners. On April 4 Mayor Maybury sent to the council a veto of this resolution, but the council refused to receive it, President Beamer declaring that the mayor had no veto power under the circumstances. The commissioners are already negotiating for the purchase of the Detroit street railways, the price of which may be about \$20,000,000.

CINCINNATI'S FILTRATION EXPERIMENT.

(Abstract from the "Final Resume and Conclusions" in the report of George W. Fuller, chief chemist and bacteriologist in charge of the experimental English filter plant at Cincinnati, Ohio.)

In the purification of those classes of water for which the English type of filters is strictly applicable, the available evidence indicates clearly that this method is a satisfactory one when the filters are properly constructed and operated. Further, so far as our knowledge goes, this method is ordinarily somewhat more efficient and more economical for water for which it is readily applicable than any other process of purification which has received serious attention.

But in the consideration of this method of purification with reference to the river waters of the central west, where frequent freshets cause the water to be laden with comparatively large amounts of silt and clay, it is found that English filters have decided limitations in their applicability.

At the outset of these investigations the position was taken, endorsing the recommendation of the Engineer Commission, that the Ohio river water at Cincinnati should receive a preliminary treatment by plain subsidence to prepare the water for clarification and purification by English filters. Experience in the operation of the fifteen original experimental filters of the English type showed the wisdom of this step, because the suspended matter in the river water would increase materially the cost of treatment, and, of still greater importance, would preclude at times the possibility of securing filtered water of satisfactory appearance and character.

For the sake of explicitness it is desired to show, with the data of the fairly normal year of 1898, the proportion of the time when English filters would be inapplicable in the purification of the unsubsidized Ohio river water at Cincinnati. This necessitates fixing an average limit of permissible suspended matter in this river water, and is a difficult matter from present evidence.

In part this is due to variations in the character and in the relative amounts of the suspended silt, clay, and organic matter; and in part it is due to different amounts of clay stored in the said layer, which affects materially the capacity of the filter to retain the clay of the applied water. During these investigations the unsubsidized river water was not regularly applied to filters; and, with the exception of the results of tests for a few days only, it is necessary to depend upon general information obtained with reference to this point. So far as our information goes, it appears that an average of 125 parts per million is a conserva-

tive estimate of the amount of suspended matters in the unsubsidized river water, which could be regularly and fairly satisfactorily handled by English filters. But at times this estimated average would be too low, and at other times too high.

It was demonstrated by the experiments that the daily amounts of suspended matter in the unsubsidized river water for 1898 exceeded the above stated limit during the greater part of the year.

On the above stated basis of differentiation between waters for which English filters are applicable or inapplicable, it is found that during the year 1898 these filters could have been used satisfactorily without preliminary subsidence of the local river water on only 132 days, or 36 per cent. of the total time. In the light of this evidence it goes without saying that English filters would be a failure in the treatment of the unsubsidized water of the Ohio river at Cincinnati.

Plain subsidence for three days, as was found by the results of this investigation, causes on an average a removal of practically 75 per cent. of the suspended matters present in the local river water. Accordingly, a system of purification comprising plain subsidence for three days and English filtration is applicable for water containing more suspended matter than is the case with English filters without subsidence.

The efficiency of plain subsidence in the preparation of very turbid waters, or satisfactory filtration through filters of the English type, however, is not so great as would appear at first sight. The reason of this is that the clay particles remaining in the turbid subsided water are more difficult to handle than an equal weight of the mixed silt and clay of the original river water.

While English filters are able to remove satisfactorily on an average about 125 parts of silt and clay of the unsubsidized water, actual experience shows that they can regularly handle suspended clay in subsided water in amounts ranging only as high as from 30 to 70 parts (depending largely upon the amount of the clay stored in the sand layer), and averaging about 50 parts per million. But it is true that for two or three days on short rises in the river, or at the beginning of long freshets, the retentive capacity of the sand layers allows of satisfactory results with the clay in the applied water considerably in excess of 70 parts. As this capacity is greatly overtaxed, however, the advantage is merely temporary, as the stored clay is washed out later, producing markedly turbid effluents.

Taking an average amount of 50 parts of suspended clay in the subsided water as the basis of differentiating those days in 1898 when English filters could have satisfactorily clarified and purified the local water after plain subsidence for three days, it is found that these days amount to 197, or 54 per cent. of the total time. But, practically speaking, English filters would have been satisfactory in the treatment of the subsided water on more than 197 days in 1898, because the capacity of the sand layer to hold back the applied clay would cause the elimination from the days of failure of those occasions when there were freshets of short duration in the river; that is to say, the capacity of the filters to store clay within the sand layer would allow for a short time applications of clay much in excess of the

amounts which could be regularly handled. Based on actual results of operation of the experimental filters, it is estimated that during the year 1898 English filters could have been used with satisfaction in the clarification and purification of the subsided water on 200 days, or 64 per cent. of the total time.

While in some instances it is true that the decision as to whether or not the effluent was satisfactory might not coincide with the views of every one, yet, as a rule, the conditions were such as to preclude differences of opinion. In unqualified terms it can be stated that plain subsidence for three days is insufficient to prepare uniformly the Ohio river water at Cincinnati for successful clarification and purification by means of filters of the English type.

The system of purification under consideration was unsatisfactory along three lines, as follows:

1. At times of prolonged freshets the turbidity of the filtered water was so great that it had the brownish appearance of the unfiltered water, frequently containing over 30 parts per million of suspended clay, an amount and of a character which makes it doubtful whether it could be removed by a second filtration.

2. At times of freshets the penetration and retention of the clay within the main body of the sand layer would make the cost of scraping greater and would apparently necessitate the reconstruction of the entire sand layer at much more frequent intervals, than is normally the case in present practice with this type of filter.

3. When the filtered water was turbid and brownish for some little time there was a marked tendency towards a diminution in the bacterial efficiency of the filters. During the long freshets, frequently occurring during the winter, the evidence points to the matter as one of serious significance.

The second of these points might be tolerated, if no way could be found to obviate it; but the first and third of these points may be safely stated as prohibitive, in the absence of any practical means of assisting the filters at such times.

As these investigations showed that English filters are a failure locally, owing chiefly to insufficient preparation of the river water at times of freshets, the next logical step is to consider the best means of securing more efficient preliminary treatment of the river water. To obtain this by extending the average period of plain subsidence beyond about three days would not be practicable, on the ground of cost.

The present evidence is conclusive that the large quantities of very minute clay particles, present in the local river water for periods ranging probably from three to six months in different years (and averaging about four months), can not be removed in a practical manner in their original condition by subsidence and by filtration through English filters. So far as present knowledge upon this subject goes, there is only one way in which these clay particles can be removed, and that is to apply a chemical which shall aggregate them into flakes or masses, so that it is practicable to remove them subsequently by subsidence and filtration.

In the light of these facts it can be stated in unqualified terms that, for the

practical clarification and purification of the local river water, it is imperative at certain seasons of the year to make use of a chemical having the power to aggregate the clay particles.

In connection with the satisfactory treatment of the local water the use of coagulants is practical for the following reasons:

1. Coagulants are capable of affording the water a safe and satisfactory preparation prior to subsidence or filtration, or both, with a comparatively small expense for chemical devices.

2. Coagulants may be secured with comparatively inexpensive chemicals.

3. The total cost of coagulation in the modified English system comes within reasonable limits, because the principal item of cost, the coagulating chemical, is a prime factor only when the character of the water requires its use. That is to say, during half of the year and more, when coagulation is not imperative with this system, the cost would be merely nominal for fixed charges on the required portion of the plant devoted to chemical devices; and with the American system the advent of very turbid and difficult water to handle means simply an increase, practically speaking, in the amount of chemical.

There are two methods by which use may be made of coagulation in the clarification and purification of the local river water. In brief, the two methods, called the modified English system and the American system, may be outlined as follows:

THE MODIFIED ENGLISH SYSTEM.

In this system or method a coagulant is used only at those times when economical provisions for plain subsidence are incapable of preparing the turbid water adequately for filtration, and in such amounts that the water going upon the English filters may be properly and readily filtered. It is essential in this method that provisions be made to allow the coagulated suspended matters in the water to subside so that they will not rapidly close up the pores of the sand layer at the surface. That is to say, the water applied to the English filters must be substantially free of coagulated masses of clay.

There were investigated two procedures for the application of the chemical when required, as follows:

1. Applying the chemical to the plain subsided water when its condition demanded it, and then allowing the coagulated portions in suspension to subside in a relatively small basin interposed between the plain subsiding reservoirs and the filters.

2. Applying the chemical to the river water, when required, before the water entered the plain subsiding reservoirs, and allowing the supplementary clarification to take place in the main subsiding reservoirs, thus dispensing with the small intermediate basin.

Each of these procedures has its advantages, but experience indicated that for economical reasons the second one would be preferable.

After getting the applied water uniformly prepared for filtration, the English type of filters can complete the clarification and purification in a satisfactory manner, and with a smaller area of filters than is conventionally considered to be necessary.

THE AMERICAN SYSTEM.

With this system the chemical is uniformly applied to the water after it leaves

the plain subsiding reservoirs, the amount of chemical varying with the amount of suspended matter in the water. To facilitate the operation of the plant and to lessen the total cost of the filtered water, the water should be given an intermediate subsidence after the application of the chemical. This period of coagulation and intermediate subsidence can be varied to advantage according to the turbidity of the subsided water from about 0.5 to 6 hours, as shown by the results of these investigations.

As the water reaches the filters, it must contain a certain amount of coagulant, either left from a primary application or provided by a secondary application, so that the water may be successfully filtered through American (so-called mechanical) filters at a rate from thirty to forty times as fast as in the case of English filters.

Both in the modified English and the American systems, the factors of cost begin with the discharge of the river water into the subsiding reservoirs, and end with the discharge of the filtered water from a clear well into a gravity conduit leading to the city. Exclusive of the cost of the land, which is included in a tract now owned by the city, the estimates of cost of purification by the two systems cover all items of practical significance, independent of the maintenance of the grounds.

These estimates are based for convenience on a daily capacity of eighty million gallons. In some of its parts the actual purification works would be larger than this (owing to economy in providing for the future), and in other parts they would perhaps be a little smaller at the beginning.

Relative to these estimates, it is to be clearly understood that they are made for the purpose of comparison only. While they are based on the best evidence now available, and it is believed that they are substantially correct, yet for construction work they do not represent actual cost as determined from complete plans.

In the case of both systems the depreciation of the plant independent of general repairs and the replacement of machinery, is provided for by the sinking fund.

TOTAL COST OF THE MODIFIED ENGLISH SYSTEM PER MILLION GALLONS OF FILTERED WATER.

Fixed charges on the cost of construction.....	\$4 72
Operation exclusive of supervision and attendance.....	4 44
Supervision and attendance.....	0 42
Repairs of plant estimated at 0.5 per cent. per annum.....	0 47

Total..... \$10 35 TOTAL COST OF AMERICAN SYSTEM PER MILLION GALLONS OF FILTERED WATER.

Fixed charges on the cost of construction.....	\$3 67
Operations exclusive of supervision and attendance.....	4 10
Supervision and attendance.....	1 17
Repairs and replacement of machinery and chemical devices, estimated at 10 per cent. per annum on \$2,500.....	0 69
Repairs of plant, exclusive of machinery and chemical devices, estimated at 0.5 per cent. per annum.....	0 33
Total.....	\$9 96

The evidence obtained during these investigations shows that it is practicable to clarify and purify the Ohio river water in a satisfactory manner by either the modified English system or by the American system. Of these two systems, the experience and data indicate clearly that the American system would be the less difficult to operate; would be somewhat cheaper; would give substantially the same satisfactory quality of filtered water; and could be much more readily and cheaply enlarged for future requirements. It is therefore considered that the American system of clarification and purification would be the more advantageous to adopt for the local water supply.

MAYOR JOHNSON'S MESSAGE.

Mayor J. A. Johnson, of Fargo, N. D., sends us advance sheets of his annual message to the council, from which the following interesting quotations are taken:

"It affords me great pleasure to report a material reduction in the tax levy for the past two years. In 1896 there was levied the sum of \$82,200. In 1897 the sum of \$75,000—a decrease of \$7,200. In 1898 there was levied the sum of \$62,500—a decrease of \$13,500 from 1897 and a total decrease in two years of \$20,700.

"The levies referred to comprise the taxes necessary for salaries of city officers and all the running expenses of the city of every kind, and it also includes taxes levied to pay interest on our bonds and sinking funds on same. All other taxes levied by your honorable body are either for schools, for county and state purposes or special assessments for special improvements, and do not properly belong here. The matter of the taxes levied for school, county and state you have no control over."

"It affords me pleasure to again call your attention to the efficient volunteer fire department—no city in the country can show its superior or even its equal—which is attested by the good work it has performed in the past, and which will be equally as good in the future.

"I am aware that the purchase of a fire engine will add about \$2,000 per year to the expense of the fire department, but it is the general belief that had we had an engine at the Wasem & Gaard fire \$20,000 worth of goods, of which a large part were uninsured, might have been saved, thereby saving the extra expense of an engine for ten years. Our citizens are entitled to all the protection that can be afforded them, and when so protected they will not grudge the expense."

"In my message to the city council in 1898, I recommended the purchase of additional pumps for the water works, the old ones having been found insufficient to furnish a sufficient supply of water. The recommendation was favorably acted upon, and a Worthington pump with 3,000,000 gallons daily capacity and two steel boilers of 80-horse power each, were added last year at an expense including additional room, of about \$8,500. We now have a pumping capacity of 4,500,000 gallons daily, nearly if not equal to the pumping capacity of the city of Troy, N. Y. The water works is now more than self-sustaining, the increase in revenue being nearly 12 per cent. over that of the preceding year, while the operating expenses have been increased but

slightly from what it has been in former years."

"Five years ago it was not an uncommon sight to see wagons stuck in the mud on our principal streets, more especially in the spring time. At the time there was not a foot of paving in Fargo. To-day nearly all of our business streets are paved and some parts of the residence portions have been, and when the present paving contracts are completed we will have nearly ten miles of paved streets. That, taken in connection with our excellent public schools, the North Dakota Agricultural College and U. S. Experiment station, the Fargo College and North Dakota Business College, will make Fargo one of the most delightful places to reside in that can be found in the Northwest.

"Our sewer system, taken in connection with our paving, reaching as it does to nearly all the business parts of the city and to the greater portion of the residence parts, make Fargo not alone a delightful place to live in, but one of the healthiest in the United States, as can be verified from the health report of the health officer. The amount expended for paving, sewer extensions, extensions of water mains and addition to the pumping station, aggregated \$108,690 last year."

COMPREHENSIVE FINANCIAL STATEMENT.

The most comprehensive statement of the financial transactions of a municipality to reach this office recently comes from John J. Somes, city clerk of Gloucester, Mass., in the form of a large blue-print chart. The chart shows in detail all the financial dealings of Gloucester for the past twenty-five years. Each of the twenty-five years is given a column of sixty-three items, which show the expenditures of all departments and funds, contributions to the sinking fund, increases and decreases of the city debt, the net indebtedness, temporary loans, assessed valuation, tax rate, etc. From the statement we take the following figures:

	1874.	1898.
Total departmental expenditures	\$159,346 91	\$353,376 04
Net debt	202,048 43	290,467 32
Assessed valuation.....	8,472,329 00	15,690,271 00
Rate of taxation per \$1,000	21 00	17 60

These items are sufficient to demonstrate that the finances of Gloucester have been ably managed during the past quarter century. Clerk Somes is entitled to much credit for the thorough manner in which he has compiled the statement.

COLUMBUS STREET SWEEPING AND SPRINKLING.

The annual report of City Engineer Griggs, of Columbus, Ohio, says the work of street sweeping for 1898 covered 99.13 miles, as against 69.89 miles in 1897, and the average price per great square of 10,000 square feet up to January 1, 1899, has been 21 4-10 cents, as against 23 7-10 cents in 1897. The engineer considers the price too low when the quality and quantity of work is considered.

The miles of streets sprinkled in 1898 were 9, and the cost was \$260.21, a decrease of \$39.65 per mile from 1897.

PAVING AND SEWERS.

What Cracks Asphalt Pavement.

There will be an immense amount of paving in Toledo, Ohio, this summer, as well as new sewers and other public works. Twenty-eight streets are already under legislation and several more are projected.

During the recent cold snap City Civil Engineer Brown made an examination of city streets and found that some of the asphalt pavements have been heaved up out of shape and badly cracked. Opponents of asphalt have taken this fact for a text and are now making claims that asphalt is not a suitable material for a cold climate.

Mr. Frank E. Cole has been a paving contractor in Toledo for many years and has put down all sorts of pavements to the value of hundreds of thousands of dollars. He now has asphalt contracts on

this winter the frost entered the ground to a depth of about four feet, and where there was a quicksand, there was necessarily an expansion that raised the pavement. This occurred on streets that were paved with materials beside asphalt, notably Batavia street and Lawrence avenue, which are paved with brick. In cases of this kind a few inches of foundation does not make any difference.

"The only remedy for this state of affairs is to take out the quicksand when the pavement is put down. The excavation should be made below the frost line and then should be filled with broken stone or earth that does not hold water. Of course, this would make a pavement more expensive than under ordinary conditions, but it would be cheaper in the end, and the pavement would be practically indestructible. We claim that

and the residence of Elbridge T. Gerry. The pavement is that known as the standard European asphalt, and was laid with the natural rock asphalt from the mines of the Compagnie Generale des Asphaltes de France, Ltd., at Seyssel, France, and Ragusa, Sicily, having been reduced to a powder and heated at the company's works in the Borough of Queens, city of New York. The work was done under contract with the park department and under the supervision of the manager, Mr. T. Hugh Boorman, of 32 Broadway. The area of the work is 3,665 square yards. This kind of pavement is in use in New York, Brooklyn, Philadelphia, Long Island City, Boston, New Orleans, Montreal and Ottawa.

Municipal Quarry and Crushing Plant.

From the annual report of City Engineer Edwin Main, of Rockford, Ill., the



NATURAL ROCK ASPHALT PAVEMENT. THE PLAZA, NEW YORK CITY.

hand, although he is not dealing in that material altogether. He denies that asphalt is unfitted for pavement in any climate and gives his reasons. "The climate does not affect asphalt," says Mr. Cole, "and where asphalt pavements have been damaged during the cold weather, the cause is entirely outside of the material used. Among asphalt streets in Toledo that show cracks and other damage since the cold weather are Norwood avenue, Scottwood avenue and Virginia street. On these streets the pavement was heaved up during the cold weather, and the pavements cracked in many places. This was not the fault of the contractors who laid the pavements or the material used, but was caused entirely by peculiar conditions of the subsoil over which the pavement was constructed. On the streets mentioned there are deep quicksands constantly full of water. Owing to the exceeding cold of

when properly constructed an asphalt pavement is the best in the world. It is the most sanitary pavement, easily kept clean, practically noiseless and can be repaired better than any other. If the city will put down the right kind of asphalt pavements there will be no complaints."

The Pavement of the Plaza.

The illustration on this page shows the pavement of probably the most picturesque spot in New York, known as the Fifth Avenue Plaza. It is faced on the north by the principal entrance to Central Park; on the west is the Plaza Hotel, occupying the entire frontage from Fifty-eighth to Fifty-ninth street; on the south is the garden entrance to the residence of Cornelius Vanderbilt, and on the east side is the Hotel Savoy and the New Netherlands Hotel. The view shows the Metropolitan Club house

following description of that city's stone-crushing plant and its operation is taken:

"During the season of 1897 it was found that the old crushing plant was too expensive to operate and entirely inadequate to crush the amount of stone required for street improvements and on the recommendation of the mayor an appropriation was made for a new crushing plant and steam drill. The plant was erected in March, 1898, at a cost of \$5,769.62, and is one of the most complete and modern plants of its size in the state. It has been a success in every respect. The department has not paid out a dollar for repairs during the season, and has escaped the annoyance of small breakages. The new crusher is superior in every way to the old one, being the latest improved piece of machinery in this line manufactured by the Gates Iron Works of Chicago. The old crusher had a hopper 17x23 inches and the opening of the

jaws was 6x17 inches. The new crusher has a hopper eight feet in diameter, with two receiving openings 10x30 inches each. It enables the crushing of a great deal larger stone, thereby saving a large amount in the expense of quarrying, which is the most important item.

"The building is one of the best that could be put up for this purpose. The stone is caught in an elevator as it falls from the crusher and elevated to the screen room, where it is run through a revolving screen, which separates the coarse from the fine. From the screen it runs in shoots to the proper bins. Three sizes of stone can be furnished if desired and in loading all that is necessary is to pull a lever and in a very short time the wagon is loaded with a yard and a half of rubble. Adjoining the crusher room is a fine engine and boiler room with a cement floor.

men to operate the hand drill and the average depth drilled was eighteen feet per day. This it is found, by inquiring among local quarrymen, to be a good average for hand drilling. The cost of operating the hand drill was \$4.50 per day, or 25 cents per foot, not including repairs. During the season 15,130 feet were drilled, so that it can be readily seen that there was a large saving in this item.

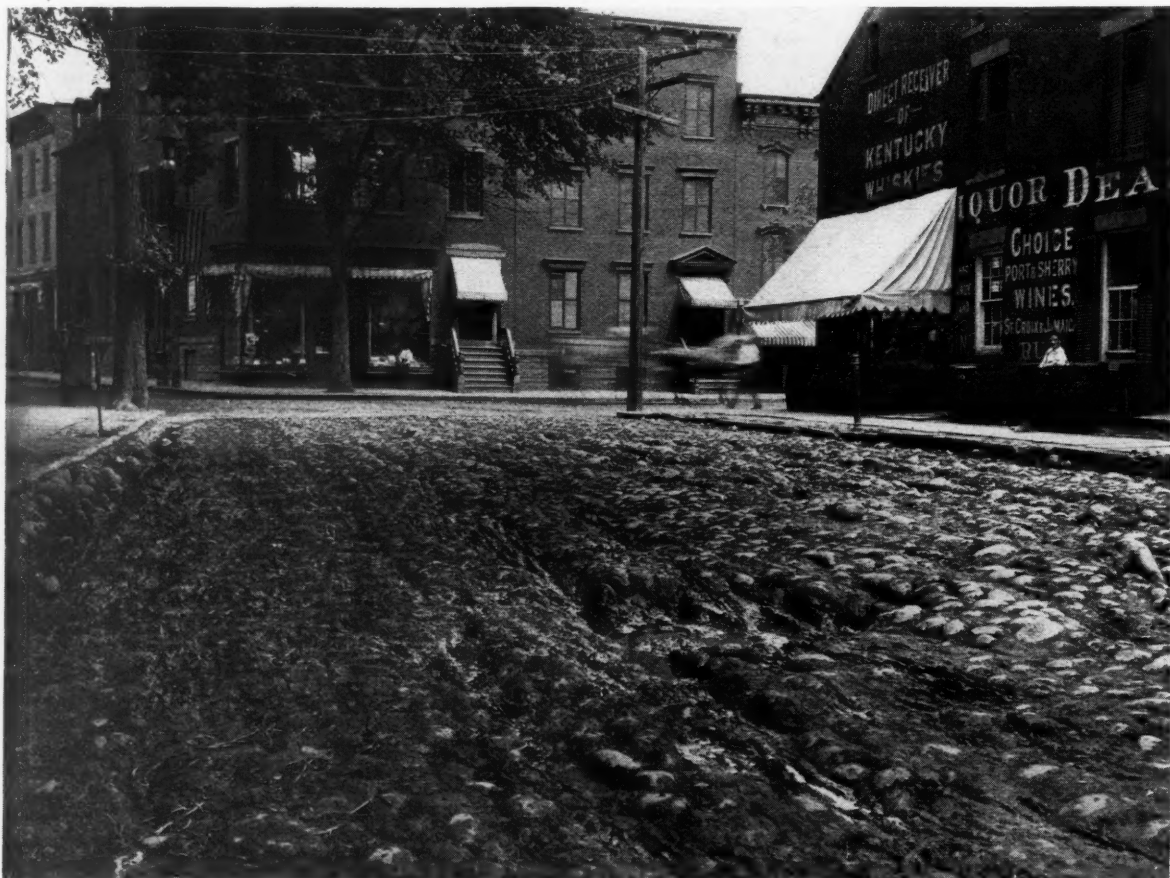
"There were 17,880 yards of rubble crushed during 1898, at an average cost of 29 cents per yard."

Green Street Improvement, Albany.

The principal turnpike leading into the city of Albany from the south is known as the "Bethlehem turnpike." This is called South Pearl street after passing within the city limits. Unfortunately

such traffic the pavement was placed on a bed of concrete eight inches in thickness and the pavement was let under a guarantee of maintenance of ten years, 25 per cent. of the contract price for the brick pavement being retained until the expiration of the term of maintenance. The contract price for the pavement, including the excavating to sub-grade, and furnishing and laying the concrete and bricks, was \$2.10 per square yard. The bricks used were re-pressed shale from Catskill, N. Y.

Green street was formerly called Vandreisen street. At the place shown in the illustration there is a second cobblestone pavement at a depth of from four to five feet below the surface. Many years ago the surface of the street was raised in elevation and as it was not thought worth while to relay the cobblestones they were filled over and an en-



GREEN STREET, ALBANY—BEFORE RE-PAVING.

"The engine is an eighty-horse power, New York safety. About fifty-horse power is required to run the machinery, so that the plant has all the power that will ever be necessary to run the same.

"Three automatic dump cars of the capacity of one and one-half yards each were made by the Love Manufacturing Company of this city and have given excellent satisfaction. The automatic dump saves the time of two men who formerly did this work.

"All of the drilling this year was done with an Ingersoll-Jergeant steam drill, with two sets of drills, capable of drilling to the depth of sixteen feet. It takes the time of two men to operate the same at an expense of \$3.25 per day. The largest day's drilling was 150 feet, the average amount per day 125 feet. The actual cost of drilling, including steam, sharpening drills and repairing, is a little less than four cents per foot. It required three

this street is very narrow, measuring only 26 feet between the curbs at many points, and the street railway with numerous turnouts renders vehicle traffic difficult. South Pearl street is poorly paved with square trap block paving laid many years ago. The city desired to relieve the congested traffic of South Pearl street and therefore caused the parallel street, known as Clinton street, to be paved a few years ago. This street lies west of South Pearl street and was paved with a substantial and modern granite pavement. Last year Green street, lying east of South Pearl street, was also re-paved, but with re-pressed vitrified bricks instead of granite, at the urgent request of the property holders of the street. Since Green street parallels South Pearl street and lies to the east of it, there was reason to suppose that most of the heavy traffic would be diverted into Green street. To provide for

tirely new pavement of a like material was laid over the new filling. In making the improvement of 1898 the old cobblestones were all crushed and used in the concrete, as far as they were removed. Of course the lower pavement remains still in place. The upper cobblesone pavement shown in the illustration was laid in 1850.

Chicago Street Improvements.

Superintendent of Streets Doherty, of Chicago, has made a partial report to Commissioner McGann of the street improvements to be accomplished in that city this year. It consists of a list of streets, indicating the kind of pavement to be used. The list shows that contracts have already been let for sixty-five improvements, eighteen streets to be paved with asphalt, three with brick, twenty-two with cedar and twenty-one with

macadam. Of improvements decided upon but yet not contracted for there are 292, comprising a distance of about 175 miles. Of those improvements eighty-one are macadam, twenty-six granite, 102 asphalt, 136 brick and thirty-seven cedar. The asphalt pavement costs about \$70,000 a mile, the granite \$95,000, the brick \$55,000, cedar \$30,000 and macadam \$30,000.

Estimates furnished to Superintendent May of the bureau of special assessment by Superintendent of Streets Doherty placed the amount of expenditure for the proposed improvements at \$9,343,000. The amount in the contracts already made is \$960,542.

Unsanitary Pavements.

The board of public works in Detroit recently sent out letters to about 75

Municipalities Combine on Sewer Project.

One of the most important bills passed by the New Jersey Legislature during its session just closed was a general law authorizing municipalities to join together in the construction of main outlet sewers. Although a general law, the specific instance for which the bill was introduced was to permit the construction of a joint tide-water sewer for the municipalities of Newark, South Orange, Vailsburg, Irvington, West Orange, Millburn and Short Hills, New Jersey.

The question of providing sewerage for these municipalities has been under discussion for more than ten years, and reports have been presented to various of the towns interested by many prominent sanitary engineers, including Hering, Bogart, Owen and others. The

let being in Staten Island Sound, where a velocity of over three miles an hour at all stages of the tide and a depth of over 20 feet of water will dispose of the sewage in the most perfect and effective manner possible.

Probably one of the most novel and interesting features of the design is the suggestion of a scheme for doubling the capacity of the sewers at any time in the future by an expenditure of less than 25 per cent of the cost of constructing a duplicate line of sewer to tide-water. The advantage of this suggestion, where it is applicable, cannot be over-estimated, as sewers designed to meet any rated capacity, by this provision, can be utilized to take care of almost twice this amount of sewage, the plan proposed being the construction of certain reservoirs which will hold the sewage during what might be termed the "rush hours,"



GREEN STREET, ALBANY—AFTER RE-PAVING.

prominent physicians in that city asking them to express their views of the different pavements in use in Detroit, and the replies came in promptly. The physicians almost unanimously endorsed the attitude of the board of public works against cedar block pavement on the ground that it is unsanitary, and the expressions were correspondingly very favorable to asphalt and brick, especially asphalt.

Pavements and Sewers for Indianapolis

The city of Indianapolis has planned a large amount of construction for the coming season, including fifteen miles of pipe and brick sewers, about 40,000 square yards of asphalt pavement at an expense of \$100,000 and brick and block pavements to cost about \$80,000.

methods recommended by these gentlemen included the discharge by gravity into Newark Bay, filtration and irrigation, but none of the schemes proposed was ever deemed feasible and all were prevented from being carried into effect by various objections and injunctions.

Until the past year, each town had striven independently to reach its own solution, but to no effect, until at last a combined effort on the part of the municipalities was begun, which has resulted in the design of a system by Alexander Potter, consulting sanitary engineer, of New York city.

In this brief review of the project it is impossible to give a description of the plan as outlined by the engineer in his "Report upon the Design and Apportionment of Cost of the Joint Tide-Water Sewer," but briefly stated, the scheme, as suggested by the title of the report, is a joint sewer to tide-water, the out-

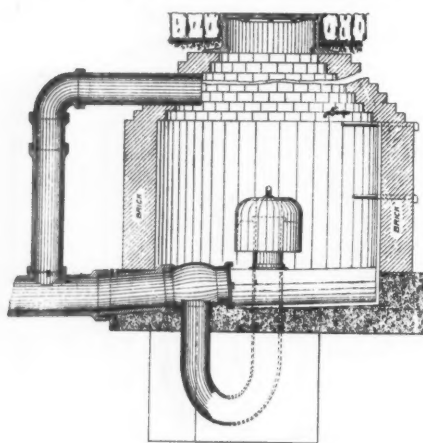
and permit it to flow uniformly away during times of less flow. To plan for this emergency and to allow proper grades for the same at this time will add nothing to the cost of present construction and is merely a matter of forethought which may be of great value in the future.

The difficulties of making a just apportionment of the cost of any combined project and of securing the consent of the interested parties to be taxed, in the proportions recommended, cannot be exaggerated. There are few, if any, precedents in this country for such a contingency, the only notable example being that of the towns in the Metropolitan Sewerage District at Boston, and the difficulties of an attempt to apportion the cost of a combined system is attested by the fact that the Metropolitan scheme was "held up" for nearly ten years, owing to the inability of the va-

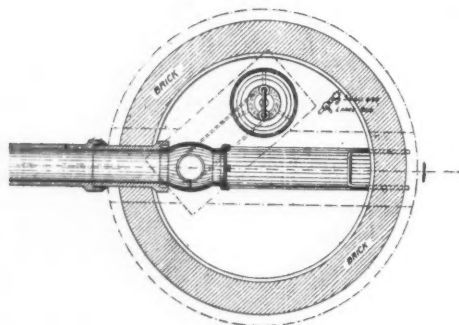
rious communities to see that they were not going to be taxed more than their just share for the use of the combined sewer. The value of the recommendations and report under consideration is therefore apparent when it is known that the method of apportionment and report were accepted and adopted by the municipalities concerned, and on this basis a bill was prepared and presented to the legislature creating these various municipalities into a sewerage district and clothing the general committee or central board with powers for installing the scheme designed. The active members of the committee of these cities and towns, who have been chiefly instrumental in bringing the scheme to its successful issue so far, are to be congratulated. The successful completion of this joint project will be the timely inspiration for many other much needed similar combinations, which alone will be the hope for successful sewage disposal for many other towns, who, acting independently, would not be financially able to carry out their sewerage project, but conjointly can easily accomplish this end and so attain perfect sewerage facilities.

An Improvement in Flushing Devices.

We present below a sketch of an improved flush tank, in which is combined all the functions of a manhole and



SECTION A-B.



HORIZONTAL SECTION

flush tank. Heretofore the use of flush tanks precluded an inspection of the upper ends of the sewers, except by the construction of a manhole adjacent to the flush tank and immediately below it. Without this manhole there was an undoubted weak point in the proper inspection of the sewers; with it an added expense to the cost of the sewers. The improvement shown in the drawing consists simply of an opening in the hood covering the short leg of the syphon of a flush tank, which, for inspection of the sewers, has a lid attached which can

be unscrewed. This form of tank was first used on the Newport News, Va., sewerage system and is now rapidly coming into general use. It is manufactured by the Pacific Flush Tank Company, of Chicago, Ill.

The Purification of Sewage.

Many American cities are interested in the proposition of securing a satisfactory purification of their sewage, and the recent decision of Chancellor McGill prohibiting the city of Paterson, N. J., from further polluting the Passaic river gives decided emphasis to the question.

The experience of Manchester, Eng., with a population of 520,000 and growing at the rate of 5,000 per annum, in securing a satisfactory system of sewage purification is therefore of timely interest.

Manchester first adopted chemical precipitation as a solution of their problem, treating 27,600,000 United States gallons daily and discharging the effluent into the ship canal. The effluent was fair, but fell considerably short of the standard set by the Mersey & Irwell joint committee, which required one grain of oxygen to the gallon, whereas the effluent actually required four grains to the gallon.

The chemical precipitation plant consisted of eleven tanks, 300 feet by 100 feet each by 6 feet deep, and cost \$82,500 per annum to operate, of which amount chemicals alone cost \$450.00 per week. It has been demonstrated that in chemically treated sewage a second decomposition takes place upon entering the body of water into which the effluent is discharged, causing the recommencement of putrefaction further down the stream. In such cases, therefore, this method of purification simply means the removal of the nuisance from your own door and its deposit at the door of your neighbor.

The method of relief first recommended was to carry the sewage from its present point of disposal at Davyhulme to tide-water at Warrington, at an estimated cost of \$1,250,000. This method, however, the people rejected in October 30, 1897.

Then it was that the corporation began experiments with the bacterial contact beds, or what is more commonly known in this country as downward intermittent filtration. The experiments with these bacterial contact beds were so successful as to warrant a board of experts, composed of Dr. Percy Frankland, Baldwin Latham and Dr. Perkins, of Owen College, engaged to examine the whole field of sewage purification, in recommending this method for treating the entire sewage of the city.

Baldwin Latham recently stated that out of twenty different proposals submitted for treating the Manchester sewage, only the septic tank and intermittent filtration were desirable for experimental purposes.

The adoption of intermittent filtration at this time by such a large corporation as the city of Manchester is of great significance, as tending to settle the question of its superiority over the new and comparatively untried septic tank system, which gave promise a few years ago of revolutionizing sewage disposal.

The Manchester board of experts concluded that the septic tank would be an extremely expensive appliance and enormously costly, although no figure of the cost of it is given. They say that it further has the defect of liability to "miss fire."

It is first proposed to discharge the sewage into large tanks, where the mineral matter in suspension and a certain part of the organic matter would be deposited without the aid of chemicals, the ditritus and grosser parts being removed by screening.

The experimental beds showed that 600,000 U. S. gallons can be cared for per acre, but if this does not give a perfectly satisfactory effluent it is proposed to apply the double contact system, which simply means that the sewage will be applied a second time to the other filter beds.

It is of general interest to note that in England before sewage purification can be adopted, two independent government boards must be satisfied, one as to the character of the effluent the other as to the economic and wise expenditure of the people's money.

The work of construction on this system will begin during the present year. The preliminary estimate of the engineer is \$777,000.

Last Year's Paving at Columbus.

At Columbus, Ohio, during the year 1898, 1.668 miles of brick pavement, .126 of a mile of macadam, a total of 1.794 miles, were constructed under the Bruck law. In the preceding year 1.908 miles of pavement of various kinds were constructed. The pavement of Fifth avenue for one square east of Summit street, which has gone to pieces, is cited by City Engineer Griggs to show that broken stone foundation is not good for such streets, and that concrete should be used, as recommended by him a year ago.

OPENING PAVED STREETS FOR CONDUITS.

City Engineer Thompson, of Peoria, Ill., in his annual report to the council, says:

"Franchises have been granted by your honorable body to the Central Union Telephone Company, the Citizens' Telephone Company, and to a company for installing and operating a central heating plant, in each of which permission has been given to open the paved streets for the construction of conduits. The stipulations regarding the relaying of the pavements disturbed vary somewhat, but the restrictions are not sufficiently severe in any. These conduits are constructed because they are economical and advantageous or necessary to the companies, and the conditions of the franchises should be sufficiently strict to guarantee that the portion of the pavements disturbed by them will give as good service as the remainder of the street. Such a result could be best obtained by requiring the companies to maintain, during the life of the franchise, the pavement along the lines of the conduits for a width covering the trench and one foot on each side thereof, in as good condition as the remainder of the street, with a further requirement on streets having concrete foundation, that eight inches of Portland cement concrete be used in relaying the pavements disturbed."

—W. L. Ames and Nicholas Pottgieser have succeeded John Copeland and P. C. Justus on the board of public works of St. Paul, Minn.

PUBLIC LIGHTING.

Cost and Profit of Electric Light Plants.

The accompanying tables, showing the approximate cost of electric arc light plants, the approximate cost of combined arc and incandescent plants and the earning capacity of the latter, were prepared from estimates made by Elmer J. Burns, of Niagara Falls, N. Y. Mr. Burns is an electrical engineer of wide experience, having been connected with several of the largest electrical companies in this country, and his figures may be taken with credence.

APPROXIMATE COST OF ELECTRIC ARC LIGHT PLANTS.

No. of 2,000 c. p. arc lamps.....	50	100	600	1,000
Cost of engine, foundation and belts.....	\$ 900	\$ 1,700	\$10,000	\$ 15,000
Cost of boiler, setting and steam piping.....	800	1,600	9,000	14,000
Cost of pumps and other fixtures.....	250	350	2,500	3,000
Cost of generator and foundation.....	1,100	1,600	9,000	14,000
Cost of switch board and electric fixtures.....	150	350	2,500	3,000
Cost of power house.....	1,500	1,500	7,500	10,000
Cost of wire and erecting same.....	1,800	2,700	18,000	32,000
Cost of poles, cross-arms, etc.....	1,500	2,400	15,000	25,000
Cost of lamps and fixtures.....	1,250	2,500	14,000	22,000
Total cost of plant.....	\$9,250	\$14,700	\$87,500	\$138,000

Table No. 1 shows the approximate cost of four electric arc light plants, with capacity of 50, 100, 600 and 1,000 arc lamps of 2,000 c. p., respectively. The 50 lamp plant would be suitable for a city of about 6,000 population; the 100 lamp plant for a city of about 10,000; the 600 lamp plant for a city of about 50,000, and the 1,000 lamp plant for a city of about 100,000. The estimates include

everything but real estate.

Table No. 2 shows the approximate cost of plants of similar capacity in arc lamps with incandescent systems added. This table also shows the estimated expenses and receipts of the plants. The expenses are estimated on a basis of running the plant on an average of 10 hours per day, or 3,650 hours per year.

Instead of allowing a percentage on the investment for depreciation, Mr. Burns suggests that to provide for the renewal of the entire plant every 20 years, \$33.60 for each \$1,000 of the total cost of the plant can be deducted from

ready to light Sherman Hospital. One year ago I made the statement that the amount the city and the public library paid for their lights during the past two years would pay for the plant. The actual cost of the plant proves the correctness of my statement. I also asserted at that time that the extra cost of running the same would hardly be noticed in the expense account, as no additional men would be required, no additional boilers needed, and that an increase in the coal bill would be the only probable added expense, but even this could be eliminated if the extra load were taken off the one engine now in use.

"At the time this statement was considered political buncombe by some and foolishness by others. Subsequent events verified my assertions. The incandescent plant was started the latter part of the month of June, 1898. The cost of coal consumed at the electric light station from July 1, to December 31, 1898, as compared with that for the same period in 1897 was:

1897. 1898.
Total for six months. \$1,672.65 \$1,635.68

"You will note by these figures that it cost \$36.87 less for coal to run both the street and incandescent plants for the last six months of 1898 than it did to run the single street light plant for the last six months of 1897, although the same price per ton was paid for coal. Still further comparing the cost of coal consumed to maintain the single street light plant for the whole year 1897, which was \$3,229.00, with the total cost of coal consumed for both the plants for the year 1898, which was \$2,790.00, you will see that both plants were run at a saving in cost of coal of \$439. These figures are absolutely correct, being taken from the bills for coal furnished to the electric light station and certified to by the city clerk. The itemized account for the two years shows that the double plant has been conducted at a less expense than the single:

	1897. Single Plant.	1898 Double Plant.
Salaries	\$4,645 00	\$4,620 00
Coal	3,229 00	2,790 00
Carbons	668 54	663 98
Lamp globes	41 26	72 31
Oil, waste and boiler com- pound	171 45	152 28
Insurance	99 80	180 00
Incidentals	202 93	236 82
Lamp repairs	78 43	48 62
Ordinary repairs	212 42	363 18
Fire grates	none.	32 27
Repairs on buildings	72 31	44 47
Repairs on engine	127 67	12 20
Maintaining horse and barn rent	147 21	32 50
Instruments and tools....	31 24	77 37
Stationery	18 65	5 00
Repairs on line	297 50	223 34
Total expenditures	\$10,043 89	\$9,467 47

"We find that the city owning and operating its incandescent system, running on an average of 600 lights per day, did not cost the taxpayers of Elgin one dollar except the interest on the cost of plant, which did not exceed \$3,500. Six per cent. interest on this amount for six months would be \$105, as a total cost for furnishing the incandescent lights for that period, or \$210 for one year—less than one-tenth of the price paid for a less number of lights to the Elgin Electric Light Company."

APPROXIMATE COST AND PROFIT OF COMBINED ARC AND INCANDESCENT PLANTS.

No. of 2,000 c. p. arc lamps.....	50	100	600	1,000
No. of 1,600 c. p. incandescent lamps.....	1,500	4,000	15,000	25,000
Cost of engines, foundations and belts.....	\$5,000	\$11,000	\$50,000	\$77,000
Cost of boilers, setting, etc.....	4,700	10,000	46,000	75,000
Cost of pumps, condensers, piping, etc.....	900	2,500	9,000	17,000
Cost of generators, foundations, etc.....	3,600	10,000	46,000	70,000
Cost of switch board and electric equipment.....	600	2,000	9,000	20,000
Cost of power house.....	2,000	2,500	15,000	25,000
Cost of wire and erecting same.....	3,300	6,000	60,000	118,000
Cost of poles, cross-arms, etc.....	2,100	4,000	52,000	110,000
Cost of lamps and fixtures.....	4,200	7,500	35,000	48,000
Total cost of plant.....	\$26,400	\$55,500	\$322,000	\$560,000
Interest on investment at 5 per cent.....	\$1,320	\$2,800	\$16,000	\$28,000
Insurance, oil, carbons, etc.....	480	1,080	5,500	9,000
Wages.....	1,800	7,300	18,000	30,000
Supplies and repairs.....	2,050	4,720	20,000	30,000
Coal for av. run 10 hours a day.....	2,200	5,500	19,000	27,000
Total operating expenses.....	\$7,850	\$21,400	\$78,500	\$124,000
Income from arc lights at \$100 each.....	\$5,000	\$10,000	\$60,000	\$100,000
Income from incandescent lights at \$6 each.....	9,000	24,000	90,000	150,000
Total income, exclusive of receipts for power.....	\$14,000	\$34,000	\$150,000	\$250,000
Total net profit.....	\$6,150	\$12,600	\$71,500	\$126,000

Elgin's Incandescent Light System.

The city of Elgin, Ill., has owned its street lighting plant for some years and during the past year has added an incandescent plant to the system. When Hon. Arwin E. Price, mayor of Elgin, was called upon by a representative of "City Government" for the facts in regard to the matter, he said:

"We already had our own street lights and we saw no good reason why we should not supply the incandescent lights used by the city. Therefore a new incandescent dynamo of 1,500 light capacity was added to our lighting system, together with the necessary lamps, wire, poles, transformers, etc., which furnishes light for the city hall, public library, fire buildings, park pavilion, and stands

FIRE DEPARTMENTS.

About Fire Department Horses.

William C. Clarke, who has entered upon his third term as mayor of the city of Manchester, N. H., is a horseman and has some good views concerning them in relation to the various city departments. In his inaugural address, delivered before the council, Mayor Clarke said: "There is one matter that has been strongly impressed upon my attention during my experience in the mayor's office as calling for a reform, and that is the matter of the buying of horses for the use of the city. The present method is all wrong, as every intelligent citizen conversant with it is aware. There should be a general purchasing agent of horses for all of the city departments and the buying of horses should be under his sole direction. As it now is and always has been, green horses, as a rule, have been bought and placed in service in the fire department before they were properly acclimated and fit for duty. Many a good and valuable horse has been ruined under this practice. In my judgment no horse should be assigned to active fire duty until he has been fully acclimated and conditioned by steady work in some of the other city departments. There should be several emergency horses always on hand ready to be transferred at immediate notice from either the street department or the city farm to the fire department, and such authority should be lodged in one responsible head, and that head should be the purchasing agent. Money is annually thrown away by the city of Manchester under the present system of horse buying for the fire department, and it always will be until horses are seasoned and hardened by moderate work outside the department before they are put into the rapid, exacting labor of running to fires. And wherever horses are assigned they should remain until the judgment of the authority that placed them there sees fit to change them. It does not seem to me necessary to go outside of official circles to secure a purchasing agent, or that the selection of one should cause any additional expense to the city."

Report of Adams' Volunteers.

H. A. Jones, chief engineer of the volunteer fire department at Adams, Mass., in his report for the fiscal year just closed, says: "The record for the year shows there were twelve alarms, with a reported loss of \$1,181.85. The fires were all confined to the buildings in which they originated." In reply to criticism concerning the expenditures of the Adams fire department, Chief Jones submits the following comparative statement:

Towns.	Property Val'n.	P'p'l'n.	Expenses Fire D't.
Adams	\$4,550,643	7,837	\$1,624 75
Athol	4,018,345	7,364	5,611 00
Gardner	5,023,759	9,183	3,800 00
Bennington ..		7,500	4,346 00
Westfield	8,050,539	10,663	7,500 00
Ware	4,117,500	7,651	6,000 00
W. Springfield	4,567,529	6,125	2,700 00
Southbridge ..	3,589,172	8,250	3,700 00
Milford	5,447,808	8,958	7,500 00

In closing, the chief recommends the appointment of a committee to investi-

gate the question of putting in a chemical apparatus.

Good Things in Hughes' Report.

Major Edward Hughes, chief of the Louisville fire department, in his report for the last fiscal year, presents a most complete record of the fires of the year. This record is shown in tabulated form and covers the following items: Date, station, time alarm received, alarm received from whom, time out-signal received, name of operator on watch, description of building (stories high and construction material), owned or occupied by whom, description of property as to use, location, cause of fire, loss, insurance loss, insurance, loss over insurance.

The Louisville department answered 669 alarms during the year; the total loss was \$679,469.32; insurance loss, \$672,136.48. The total running expenses of the department were \$223,469.94, against an appropriation of \$223,680, showing an unexpended balance of \$210.06.

In his report Major Hughes makes this characteristic and wise observation: "You might put at my service the entire yearly output of the largest fire engine factory in the country, and give me all the live-stock on the largest Kentucky blue-grass farm to haul them around with, and then where would I be without water? I would be just where old Dives was when he begged Lazarus for that impossible drink of water, to cool his parched tongue—right in the middle of a prodigious hot place, and no water to cool off with. I, of course, do not want any of you gentlemen to actually realize the condition of Dives, but I want you to imagine as vividly as possible what it must have been. The moral of this story is the indispensable necessity of water to enable an engine to cool off the fire. I hope, gentlemen, that you will apply this moral where it will do most good. Even in the central and business portion of the city, I am sometimes all broke up by the scarcity of water."

Fire Protection for High Buildings.

Chief Engineer Bonner, of the New York fire department, makes the following suggestions to protect high buildings against fire:

Each building should be equipped with a standpipe.

Standpipes should not be less than six inches in diameter and should be made of galvanized steel.

If the building covers a large area there should be two standpipes of the same size in the structure.

Branch connections should not be less than two and one-half inches in diameter and should be fitted with regulation screw thread.

Standpipes should be tested up to a pressure of 200 pounds at least.

They should be connected with the house pumps and should be ready for use at any time, day or night, by the private force or the department.

Elevators should be kept ready to run at all hours of the night.

There should be men enough employed in every building to operate the auxiliary plant until the department arrives.

There should be plenty of watchmen and electrical communication from every floor with the engine room.

There should be a competent engineer on duty at all times in each building.

Every building should be connected with fire headquarters by a special alarm box.

Standpipes should be connected with the street at the front of the building, near the main entrance, for the use of the department.

Where tanks are used there should be a check at the upper end of the downward pipe, so that it may be used by the department.

Water on High Buildings.

Early on a recent Sunday morning Chief Bonner and his assistants made a test of the ability of the New York fire department to force water to the roofs of the skyscrapers in sufficient quantity to extinguish a big blaze, exclusive of the auxiliary plant of all tall buildings. The test was made on top of the St. Paul building in lower Broadway, 317 feet above the street level.

At exactly 6 o'clock Foreman Hicks signaled to go ahead, and almost immediately the hose on the roof rounded out and became solid. The nozzle was opened and a level stream of water shot into the air from a point 317 feet above the street, across Broadway, over St. Paul's Church, and fell into the churchyard beyond. It was a distance of fully 250 feet. The engineer by toots of the whistle signaled that he had 180 pounds of pressure on the ground. On the roof the gauge read sixty pounds, showing that the water pressure had been diminished just two-thirds in the climb of 317 feet.

After the test Chief Bonner said: "We found out that we can force the water to the roof of any skyscraper in town, and do it easily. We were throwing 260 gallons a minute and were doing it with a low pressure."

Chief Marjenhoff's Annual Report.

O. G. Marjenhoff, chief of the fire department of Charleston, S. C., sends in a copy of his report for the year 1898, from which the following notes are taken:

Total expenditures for the year, \$48,331.90, of which \$39,485.99 was for salaries. Number of alarms, 121; total loss, \$32,484.67; property at risk, \$784,111; insurance, \$514,975.

The force consists of 99 officers and men, and the equipment comprises ten steam engines, one double 80-gallon tank chemical engine, 9,698 feet of hose, two fuel wagons, three carts, six hose carriages, four hose wagons, one aerial truck, two trucks, fifteen fire extinguishers and thirty horses.

Work of the Tacoma Fire Department.

The annual report of Chief Engineer Payns, of the Tacoma, Wash., fire department, shows that the total expenditures for 1898 amounted to \$41,145.03, of which

\$32,116.48 was for salaries. The force consists of one chief at \$100 per month, one assistant chief at \$75 per month, one night clerk at \$45 per month, seven captains at \$65 per month, six lieutenants at \$60 per month, four engineers at \$70 per month, four stokers at \$60 per month, twelve drivers at \$60 per month, one tillerman at \$60 per month, six hose and laddermen at \$55 per month, one supply driver at \$50 per month.

During the year there were 177 alarms; the total fire loss was \$218,075.45; insurance, \$517,900; insurance paid, \$34,965.60. In the fire loss stated above is included the Tourist hotel fire, which alone accounts for \$150,000.

Report of Bangor Fire Department.

Chief Engineer Mason, of the Bangor, Me., fire department, has submitted his annual report for 1898. It shows that the force consists of 87 men, as follows: Chief engineer, three assistant engineers, one superintendent of fire alarm, one chief engineer of steamers, two assistant engineers of steamers, six drivers of hose and ladder wagons, two drivers of steamers, six captains, six lieutenants, six clerks, forty hosemen, twelve laddermen, one steward and superintendent of hose. Fourteen of this number are permanent men, and the rest are call men.

The apparatus of the department consists of two combination hose and ladder wagons, one two-horse hose wagon, two one-horse hose wagons, two hose sleds, three hose plugs, three steamers, one three-horse ladder truck, one two-horse ladder truck, ten chemical extinguishers, one chief's wagon, one chief's jumper, three exercising wagons, two set hub runners.

Fire Department Items.

—Twelve new engine houses of modern design are to be built immediately at Los Angeles, Cal.

—A new headquarters building for the Seattle, Wash., fire department is proposed. It will cost from \$10,000 to \$15,000.

—The volunteer fire department of Reading, Pa., a city of about 85,000 population, consists of twelve companies. The only paid men are the chief, who receives \$75 per month, and his two assistants, who are paid \$150 per year each. The separate companies pay their drivers \$11 per week each.

The city of Danville, Ill., is soon to have a new engine house fitted out with modern apparatus. Chief Taylor is doing much to bring his department up to the standard of other cities.

—The fire department of Bloomington, Ill., is to be re-enforced the coming spring by a new engine house and an aerial hook and ladder truck of modern make. Chief Mayer is a model leader.

—The fire department of Indianapolis contemplates the purchase of three new hook and ladder trucks and 4,000 feet of cotton hose; also the construction and equipment of a new central house and one engine house.

—Chief Black, of Duluth, Minn., reports 232 alarms of fire during the year and a loss of \$66,650. The department numbers 75 men. There are two assistant chiefs, one lineman, one fire warden, two blacksmiths, one veterinary surgeon, eight captains, nine lieutenants, four engineers, three stokers, fifteen pipemen, twelve truckmen and sixteen drivers. Chief Black recommends the addition of a first-class fireboat.

—A third size Metropolitan engine has been ordered from the American Fire Engine Company, Seneca Falls, N. Y., by the board of fire commissioners of Bridgeport, Conn.

—The State Firemen's Association of Connecticut will hold its annual convention at New London, May 16 and 17. About three hundred delegates are expected to attend.

—The Board of Fire Commissioners of the city of Buffalo, N. Y., awarded a contract on March 20 to the American Fire Engine Company, of Seneca Falls, for a new fire engine. It is to be a first size "Metropolitan" and will cost \$4,500.

—A copy of the last annual report of the Atlanta fire department, handsomely bound in leather and lettered in gold, has been received at this office from Chief W. R. Joyner. This report was noticed in the January number of "City Government."

—Chief Meader, of the Oneida, N. Y., fire department, has made his report to the board of commissioners. According to this the department consists of thirty-six paid officers and men and eighteen volunteers. During the year there have been twenty-five alarms.

—The American Fire Engine Company, Seneca Falls, N. Y., has just received an order from Arecibo, Porto Rico, for a fifth size Silsby engine, 1,000 feet of hose and a hose cart. This, we believe, is the first order placed for fire apparatus by any of our new possessions.

—The executive committee of the International Association of Fire Engineers will soon be called together for the purpose of setting a date and arranging the program for this year's convention, which is to be held at Columbus, O. Secretary Hills has sent out a letter asking for suggestions of topics to be discussed at the convention.

—Police Commissioner E. J. Meegan, of Albany, N. Y., has resigned and Gen. John P. Masterson has been appointed as his successor. When the new city charter goes into effect on the first day or next year, the Board of Police Commissioners becomes a thing of the past, and the police, fire and health departments of Albany come under the control of a commissioner of public safety. It is said that Gen. Masterson has been put on the police commission for the remaining nine months of its existence in order to get him in line for the position of commissioner of public safety.

—The Murray Iron Works Co., Burlington, Ia., are now working on the following contracts: One 500 horse power Corliss engine for the city of Topeka, Kan.; one 300 horse power Corliss engine for the Sherman (Texas) cotton mills; one 200 horse power Corliss engine for the Mill & Elevator Co., of Gainesville, Texas; one complete steam plant, including 100 horse power Corliss engine, tubular boiler, pump, pipes and heater for a mill at Flushing, Mich.; one 60 horse power Corliss engine for Canada; one 50 horse power Corliss engine for Mexico; two 50 horse power Corliss engines for Chicago; three 200 horse power internal-furnace boilers for the Council Bluffs city water works; two 150 horse power boilers for a new electric road in Northern Illinois; two mining engines for Colorado, four for Utah and one for Arizona; one 100 horse power boiler for Colorado; one 50 horse power boiler for Arizona; one 70 horse power boiler for Iowa; three 100 horse power boilers for Texas.

General News Items.

—Bloomington, Ill., is agitating the matter of putting in a crematory for the disposal of garbage.

—The municipal electric light plant at Chicago will soon put one thousand additional arc lamps in service. Ten new 150-light arc belt driven dynamos are to be put in.

—Mayor Truelson of Duluth, Minn., recommends that the city move at once in the matter of a municipal electric light plant, and points out that it has now a site, buildings, boilers and engines for making over 500 arc lights, and that all it needs is the dynamos, which will cost very little.

—The police department of Bloomington, Ill., under the management of Chief Schroeder, is doing good work. It needs the Gamewell system of patrol signals and the Bertillon system for the identification of criminals.

—Danville, Ill., enjoys the distinction of procuring its electric light service at a lower rate than any other city in the United States. For a moonlight schedule service it pays \$30 per year for a 2,000 c. p. light. Soft coal, cheapest grade, can be had at 60 cents per ton. The service is given by a private company.

—Dr. Justus Ohage has succeeded Dr. A. J. Stone as health commissioner of St. Paul, Minn. Dr. Ohage is one of the best physicians of this city and will be expected to conduct the health department with the same efficiency that marked the administration of Dr. Stone.

—Lead, S. D., is a city of nearly 8,000 population, and yet it has no sewerage system. The city council has now voted to put in one of the best sewerage systems in the state. Estimates of the cost have been made by Engineer Rosewater, of Omaha, who places the figures at \$26,000. The council will pay more than that for the system before it is completed, probably not less than \$50,000.

—The W. J. Clark Company, plate and sheet metal workers at Salem, Ohio, have received an order from a Jersey City firm for a large number of barrels—to be made of sheet steel. As this is the second large order for such barrels from the same firm it is safe to suppose they serve the purpose well for which they are wanted. We do not know what they are used for, but they have the merit of being non-combustible—no likely to dry up and fall to pieces and are rot proof.

—The Murray Iron Works, of Burlington, Iowa, had one of their 24x48 Sioux Corliss engines at the Omaha Exposition that made a run probably without precedent in stationary engine practice. It was operated twenty-four hours per day for fifty days, or 1,200 consecutive hours, with one stop of thirty minutes. For eighty days it ran twenty-three and twenty-four hours per day, as the authorities desired, and its total run was 2,983 hours in 155 days; an average of more than nineteen hours per day, from the dull days at the start to the rush at the finish.

Paving Contracts at Joliet.

Contracts have just been awarded at Joliet, Ill., for more than \$100,000 worth of asphalt paving work. The work is to be guaranteed for ten years. The bids ranged from \$1.50 to \$1.92 per square yard, exclusive of curbing and excavation.

CITY GOVERNMENT.

Devoted to all Departments of City Work

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SPECIAL NOTICE.

City officials and friends of City Government visiting New York are cordially invited to make the office of City Government their headquarters during their stay in the city. Desks, stenographers and stationery are placed at their disposal, and their mail may be addressed in our care.

SOME MAYORALTY ELECTIONS.

The most significant municipal election of the month was the one at Toledo, Ohio, where Samuel M. Jones was re-elected to the mayor's office, despite the antagonism of the politicians and the partisan press. Last month in these columns we pointed out a number of reasons why Mayor Jones should be elected, and we are happy now to chronicle the fact that a majority of the voters of Toledo reasoned as we did and had the courage to vote according to their convictions. Two years ago Mr. Jones was given the Republican nomination, and after being elected he was expected to yield to the demands for patronage made by the managers of the party machine. But the mayor could see no reason for appropriating the city's property and funds to the use of any political party. Furthermore, he could see no reason for granting special privileges to the few at the expense of the many, and set out to restore to the municipal community the property rights that inherently belonged to it. It was not strange, therefore, when Mayor Jones sought renomination at the hands of the Republican party that he encountered the hostility of the "practical" politicians of his party. These "practical" men, few as they are, have a conscienceless way of nullifying

the will of the majority at primary elections, but then and there power for them ends. It was possible for them to keep the party nomination from Mr. Jones, which they did by the most shameful methods.

Mr. Jones became an independent candidate, pitted against the regular Republican and the regular Democratic nominees. The support of the daily press and the rich corporations holding municipal franchises was shared by the nominees of the parties; no share of that came to Mr. Jones. The newspapers ridiculed Jones. Ridicule is always a glittering vapor, with naught of power, but it was the only available weapon with which to fight Jones, whose official record of two years' making happened to be absolutely unassailable. Standing for a non-partisan civil service, for the municipal ownership of natural monopolies and for the greatest good for the greatest number, Samuel M. Jones, opposed by pretentious makers of public opinion, professional politicians of two parties and the money rulers of his city, was elected by a plurality of 13,310, and a majority of 10,017 over the other two candidates. We deem this significant.

The re-election of Mayor Carter H. Harrison, of Chicago, aside from being an event of serious character, adds to the gayety of our nation a conglomeration of sense and nonsense, contributed by the editorial space-killers of our daily press. The New York "Sun" expresses the belief that Mayor Harrison's victory is the triumph of vice, the expressed wish of the people of Chicago to revel in sin. For the city of Chicago, the "Sun" would have such a mayor as would prevent murder and hold-ups, eradicate the social evil and convert dive-keepers into evangelists; any man who could not measure up to this task has no fitting place within the sacred precincts of the Chicago city hall.

The New York "Times" observes that the defeat of Altgeld by Harrison betokens the political death of William J. Bryan, while the Chicago "Dispatch" serenely remarks that Harrison's election is a positive guarantee that Bryan will be our next President. The Rochester "Post-Express" is confident that Harrison's victory is a boon to the cause of municipal ownership, but this is disputed by the Milwaukee "Sentinel." The Chicago "Inter-Ocean" is convinced that Harrison in the mayor's chair is a menace to vested rights, and other papers are just as sure in their conviction that Harrison is a corporation man.

In the face of all this competent, but contradictory, testimony, it would be rank egotism for us to hazard an opinion as to what the election of Mr. Harrison really portends. We shall wait and see.

Politics is a queer game in Denver, there being, apparently, as many parties as there are issues. In a four-cornered fight, Mayor T. S. McMurray, who has served two terms faithfully and efficiently, was defeated for re-election. Mayor McMurray is a close student of municipal affairs, his administration has been intelligently aggressive and progressive, and if his successor, Henry V. Johnson, makes as good a record the people of Denver will have no cause to complain.

Mayor Samuel L. Black, of Columbus, was unsuccessful in his candidacy for re-election on account of defections from his party. In state and national elections Columbus is reliably Republican, but the vote for city officers is always very close. Mayor Black drew many supporters from

the Republican ranks, but not enough to overcome the deserters from the Democratic camp. Under the federal plan, as Columbus is, the mayor is charged with extraordinary powers and equal responsibilities. In making appointments, after his election two years ago, Mayor Black necessarily disappointed a large number of party workers, and this probably had some effect on the election of this year. Judge Samuel J. Swartz, the mayor-elect, is a man of high character and considerable experience in public service. He will be a worthy successor to a good mayor.

DETROITS USEFUL CALENDAR.

It is within the power of every man, woman and child in a city to materially assist in keeping the streets clean, but in order to enlist into this service any considerable proportion of the population it is necessary for the authorities to keep in the minds of the people the work that is desired of them. One of the best ways of impressing this upon the public mind has been devised by the Board of Public Works of Detroit. This board has issued and distributed to all the homes of the city a neat calendar for the year 1899. On the card of the calendar is a photo-engraving of Detroit's famous "white wings brigade," over which, in red letters, is the inscription:

Kindly Assist Us In Every Way :
Possible in Keeping the Streets :
and Alleys of Our City :
Clean. :

The hanging of such calendars in the homes is an inexpensive and effective way of keeping alive the civic pride that prompts house-holders to do their share in beautifying the city.

NEW YORK INVESTIGATION.

The Mazet Committee, appointed by the New York Assembly, to investigate the municipal departments of New York City, has begun its work. At this writing, but one day has been devoted to the taking of testimony, but in that day Mr. Moss, the counsel for the committee, seemed to strike a promising lead. If the investigation is continued on the lines indicated by Mr. Moss at the beginning, it may be the means of officially exposing certain corrupt practices that have been generally known to exist for some years. The time has not yet come to comment at length upon the work of the committee.

NO "YOUSE" FOR READING MATTER.

Here is a letter from a man who refuses to take his paper from the post-office:

I must decline to receive your paper. Every paper in the country seems to think I cannot get along without it, and it would cost me more than my salary to comply with their demands. I am determined to cut loose from all of them and youse my salary this year for the benefit of my famley.

We wonder if it ever occurred to this man that a little studious reading on his part would be of any "benift" to his "famley."

WATER DEPARTMENTS.

American Water Works Association.

For nearly a score of years one of the leading factors in the municipal progress of this country has been the American Water Works Association. During the past twenty years a great many questions pertaining to public water supply have been solved, and their solution, with the consequent improvement of the water service, may be credited in no small measure to this association. The collection, purification, protection and distribution of the water necessary for the health, comfort, safety and commerce of a community is a proposition of sufficient significance to command constant and continual study of ways and means for improving or perfecting the numerous branches of the work. That there may be continual and systematic study of the various details involved in the public water service, with resulting improvements, is the reason for the existence of the American Water Works Association.

The organization was formed at a convention held in St. Louis, Mo., in 1880. Its objects, as set forth in its constitution, are "the exchange of information pertaining to the management of water works, for the mutual advancement of the interests of consumers and water companies, and for the purpose of securing economy and uniformity in the operation of water works; the establishment and maintenance of a spirit of fraternity between the members of the association by social intercourse and by friendly exchange of information and ideas; the inducement and extension of more cordial and friendly relations between the managers of water works and their patrons, based upon the mutuality of interests and a recognition by both, of the fact that each have rights which the other should respect."

There are three classes of membership; active, associate and honorary. Active members must be officers of water works in operation and persons engaged in the designing and construction of water works; associate members must be persons or firms engaged in furnishing materials for the construction and maintenance of water works; honorary members must be those whose scientific or practical knowledge in matters relating to water supply and whose efforts and interest in that behalf shall recommend them to the association.

There are now 460 members of the association, representing all branches of the water supply service and all sections of the country. Among the members are many scientific experts on bacteriology, hydraulics, filtration, etc., whose counsel with the men of practical training is of great value in bringing the construction and operation of water systems to a higher standard of efficiency.

The annual conventions of the association are always largely attended and great interest is manifested in the proceedings. The character of the papers read at these yearly gatherings becomes broader and more comprehensive as time goes on. Among the subjects dealt with at the last convention, which was held

in Buffalo, were: "Method of Introducing Service Pipes Without Trenching," "Oil Filter Bed for Boiler Feed Water," "Mechanical Filtration," "Compensating Reservoirs for Gravity Water Supplies," "Riparian Ownership Legal Aspects," "Deep Well Pumping Machinery," "Vegetable Growth in Ground Waters," "Municipal Franchise Contracts," "Water Meters and Water Rates" and "Filtration and Aeration." These topics will give the reader an idea of the comprehensive work of the association.

The next convention is to be held at Columbus, Ohio, May 16, 17, 18 and 19. The officers of the association are preparing a most interesting programme of papers and discussions, and the people of Columbus are making arrangements for entertaining their visitors in a lavish manner. The local committee is headed by Superintendent Jerry O'Shaughnessy, of the Columbus water department.

The eastern delegates will go to Columbus by the Pennsylvania Railroad, which has been designated as the official route. The Chittenden Hotel will be headquarters in Columbus for a large proportion of the delegates.

The present officers of the association are: President, J. A. Bond, Wilmington, Del.; first vice president, William R. Hill, Syracuse, N. Y.; second vice president, C. P. Allen, Denver, Col.; third vice president, R. M. Clayton, Atlanta, Ga.; fourth vice president, L. N. Case, Duluth, Minn.; fifth vice president, John B. Heim, Madison, Wis.; secretary and treasurer, Peter Milne, New York; finance committee, Dow, R. Gwinn, Quincy, Ill.; W. H. Laing, Racine, Wis., and Francis G. Ward, Buffalo, N. Y.

Peter Milne has been secretary of the association for about eight years and his intelligent and diligent attention to the affairs of the organization has much to do with its thriving condition. He is an engineer of long experience, has had a special training in the water field, and is in every respect the proper man for secretary of the American Water Works Association.

Report of St. Paul Water Works.

The seventeenth annual report of the board of water commissioners of St. Paul, Minn., has just appeared in book form. It embodies the separate reports of the secretary, the superintendent, the city engineer, the city treasurer and the chief mechanical engineer, showing every detail of the operations of the water department. Secretary Caulfield presents the following financial statement:

REVENUE.	
Balance on hand Jan. 1, 1897	\$15,104 43
General water receipts..	\$167,154 27
Miscellaneous water receipts	15,084 87
Connection (street services)	10,355 09
Extensions	770 74
Construction (new supply)	243 39
Frontage tax	103,927 35
Shutting off and turning on water.....	46 00
Sinking fund earnings..	16,878 94
Sinking fund	379 08
Meter	292 16
Repair	60 70
Total	\$315,192 59
	\$330,297 02

DISBURSEMENTS.

General maintenance ..	\$38,124 41
Construction (street services)	10,323 24
Repairs	2,273 62
Meters	12,533 49
Extensions	19,128 60
Construction	54,396 92
Interest	114,200 00
Frontage tax refunded..	476 44
Sinking fund	68,378 94
Sinking fund earnings..	379 08
Total	\$320,214 74
Balance	\$10,082 28

Supt. Starkey's report shows:

	Placed T't'l Jan. during 1898. 1,1899.	2.57M. 241.78M.
Water mains	19	2,268
Fire hydrants	26	2,124
Valves	3	294
Street sprinkling stand pipes	530	15,742
Service connections	1,055	3,355
Meters	4	32
Aut. fire extinguishers...		

The superintendent's report also deals with the purchase and erection of a new ten-million-gallon pumping engine from E. P. Allis & Co., of Milwaukee. At the official trial of this engine, the duty obtained was 144,463,000 foot-pounds, being 14,463,000 foot-pounds in excess of the guaranteed 130,000,000 foot-pounds, and earning for E. P. Allis & Co. the maximum bonus of \$6,000.

City Engineer Rundlett reports that the total water consumption for the year was 2,920,017,722 gallons, being an average of 8,000,037 gallons per day. Special investigations during the year revealed that on metered services the average daily consumption, per service, was 140.06 gallons, while on unmetered services the average daily consumption, per service, was 572.6 gallons.

Wilmington's Successful Water Plant.

J. A. Bond, chief engineer of the water department of Wilmington, Del., in his report for 1898, says:

"The receipts for the year have been \$164,063.32, an excess over the preceding year of \$9,377.75, largely produced by an increase of consumption by manufacturers through meters. The disbursements were \$77,229.70, leaving a surplus of \$86,833.62, which was paid to the mayor and council.

"The number of gallons of water pumped from the Brandywine during the year was 2,165,669,860 gallons—an increase over the preceding year of 124,699,335 gallons, which is represented largely by the increased revenue from the metered class, which was \$7,769.96, with a total consumption through meters of 807,125,000 gallons, or 37 per cent. of the total pumpage.

"The water repumped to the High Service Reservoir was 518,312,480 gallons—an increase over the previous year of 32,764,410 gallons.

"The Rodney Street Tower Service for the year was 6,521,500 gallons, or a daily average per capita consumption of 41 gallons—an increase of 8½ gallons over the preceding year.

"The consumption from Elliott Avenue Tower Service was 3,364,680 gallons, or a per capita of 23.2 gallons.

"The service, which was extended to the Highlands during the year, does not

give satisfaction in the most elevated districts, for want of sufficient pressure—the elevation nearly equalling the height of the reservoir. To give this section adequate service it will be necessary to connect it with Rodney tower; or to erect a stand-pipe on some high ground in that vicinity, and pump from Cool Spring Station, directly through the service mains into it.

"The water used from the reservoir in washing the filter was 50,067,750 gallons, or about 2½ per cent. of the filtered water. Deducting this amount from the total pumpage, leaves a daily average per capita consumption of 80.5 gallons. Estimating the population of the city 72,000.

"The number of meters placed during the year, including those that were removed for repair and other causes and replaced, was 133, making the number now in use 605.

"To test the feeling of our consumers of water through meters, a paper was submitted to them setting forth that they believed the meter system the only equitable method of supplying water, and that they would not desire to return to the schedule rating, to which all, with one or two exceptions, willingly subscribed.

"Most of the water pumped during the year passed through the filter beds, and the cost for maintenance, not counting interest on the plant, was \$1,162.50, or about 54 cents per million gallons."

Danville Water Case Re-opened.

Through the efforts of City Attorney George F. Rearick, the case of the private water company against the city of Danville, Ill., has been reopened. In 1883 the city council entered into a contract with the water company to pay \$75 each for the first 100 hydrants and \$67 for an excess of that number and \$50 for certain others which would in all probability be little used.

In the spring of 1895, by a vote of the council, approved by the mayor, the rate was reduced to the uniform price of \$60 for all except the few mentioned, which were placed at \$40. As the bills fell due the company rendered them at the original price and the council would allow them only at the reduced rate, which amount was rejected.

The company sued the city and secured judgment, the findings being affirmed by the Supreme Court. Now the Supreme Court has granted the motion of Mr. Rearick for a rehearing of the case.

Columbus Water Report for 1898.

The report for 1898 of Secretary-Treasurer Zuber, of the Columbus, Ohio, water department, shows that the receipts for the year were \$159,893.67; the operating expenses, repairs and refunds, \$95,360.43, showing a net profit of \$64,533.24. This, with a balance of \$2,616.25 on January 1, has all been expended for construction, and the deficit of \$28,529.23 January 1, 1899, has gone for the same purpose, making a total expenditure for the year for construction of \$95,678.72. The sum of \$49,352.19 was expended on the construction of the filtering galleries and levees at the West Side pumping station.

Superintendent O'Shaughnessy's report says that one mile and three thousand five hundred and sixty-nine feet of cast iron water pipe had been laid during the year, making a total of over 173 miles. The damage to the plant by the floods of 1898 is reviewed. The loss in

lumber at that time amounted to \$3,000. During the summer the levee was raised between Dublin avenue and the Hocking Valley railway bridge. A total of 3,550 1-2 feet of conduit was laid. Wells were sunk to the number of 34, which deliver an average of 80,000 gallons of water each 24 hours.

The cost of pumping at the West Side station was 17.64 greater than in 1897, and the water pumped 13.19 per cent. greater, and a decrease in coal of 9.30 per cent. At the East Side station the cost of pumping shows an increase of 12.16 per cent.; the amount of water pumped an increase of 2.66 per cent. The average daily amount of water pumped was 14,665,515 gallons, an increase of 1,169,681 gallons over 1897. During the year 697 meters were set, 41 service connections made.

Lowell Water Board's Report.

The twenty-sixth annual report of the Lowell, Mass., water board is a complete and interesting document. The secretary's statement shows that the total charges during the year were:

For water	\$220,642 73	
Other charges	14,091 84	
Uncollected from 1897....	29,089 41	\$263,823 98
Collections	\$194,292 30	
Discount	20,561 55	
Abatements	4,587 61	
Uncollected to 1899.....	44,382 52	\$263,823 98
Balance Jan. 1, 1898.....	\$33,384 45	
Receipts	194,291 30	\$227,675 75
Expended, 1898	\$197,469 00	
Balance Jan. 1, 1899.....	30,206 75	\$227,675 75

The superintendent's report says:

Four hundred and eighty-two (482) meters were added during the year, making a total of 4,866 now in use. This is only 47 per cent. of the total number of services, yet yields 54 per cent. of the earnings of the department or \$108,757.83 against \$89,820.63 accruing from unmetered water. These figures speak for themselves and are especially significant when considered in connection with the greater quantity of water delivered to consumers who are charged schedule rates. In other words, if the total quantity of water consumed was paid for at the regular price for metered water, viz., 14 cents per 100 cubic feet, less 10 per cent. discount, the income of the department for water would be \$412,368.65 instead of \$194,291.30, the actual receipts for the past year.

The quantity of water "used and wasted," as the report puts it, for the year 1898 was 2,454,575,265 gallons, being 47,332,251 gallons in excess of 1897. The average daily consumption was 6,724,865, making a daily per capita consumption of 78 gallons.

Fall River Water Department.

The annual report of the Fall River, Mass., water works shows the pumping for 1898 was 1,144,657,850 gallons, making a daily average of 3,136,049 gallons. Coal burned amounted to 3,513,085 pounds, or something over 1,568 tons. The gallons pumped per pound of coal were 325.82.

The water receipts for the year amounted to \$147,685.60, an increase of about \$7,000 over the preceding year. The city council, as usual, at the beginning of the year made an appropriation for water for city purposes amounting to \$10,000. This entire sum was during the year transferred to the city's contingent account, something not done before since the beginning of the water revenue in 1874; no part of the appropriation being required to meet a deficiency. The revenue from water takers for 1898 provided for the cost of maintenance, including interest.

An interesting table prepared by Superintendent Kiernan shows that of the total pumpage of 1,144,657,850 gallons, 825,906,514 gallons were accounted for, leaving 27.30 per cent. of the total unaccounted for. Of the total amount of water pumped, 58.47 per cent. was consumed by purchasers, 14.23 per cent. was used for public purposes and 27.30 per cent. wasted. Careful inspection reduced the waste of 41.10 per cent. in 1897 to 27.30 per cent. in 1898.

Bloomington's Water Plant.

The city of Bloomington, Ill., has a municipal water plant. It uses the meter system and although it sells water at from 10 to 15 cents per thousand gallons, it pays the interest on the bonded indebtedness, which is only \$5,000, and pays for all extensions of mains. At least two miles of six-inch mains will be laid this coming season. The gross annual receipts of the plant amount to about \$14,000 and the gross expenses to about \$9,000.

Water Department Notes.

—The offices of the Continental Filter Co., New York, have been moved to the Mills Building, 35 Wall street.

—The Dubuque, (Ia.) Water Company has awarded a contract to the O. H. Jewell Filter Company for a 2,500,000-gallon plant of gravity filters.

—The fire and water committee of the Waukegan, Ill., council has recommended that the meter system be adopted for the city water works.

—Reidville, N. C., has voted to issue \$25,000 of bonds for the purpose of putting in a system of water works. Only seven votes were cast against the proposition.

—Mr. Charles L. Parmelee, who was connected with the filtration experiments at Louisville and Cincinnati, is now with the Continental Filter Co., of New York. He has taken charge of the departments of engineering, chemistry and biology.

—The city of St. Paul, Minn., purchased, in March, one hundred Niagara water meters, manufactured by the Buffalo Meter Company, 363 Washington street, Buffalo, N. Y. The Niagara water meter, while simple in construction and low in price, is carefully made of the best material throughout. These meters are now used by nearly one thousand water works in the United States and Canada.

—Mayor Truelson, of Duluth, Minn., says in his annual message that in the five months that the water plant has been under the control of the city it has earned at the rate of enough to pay all running expenses and fixed charges and leave a balance of about \$12,500, which is reduced to half that amount by the fact that some \$160,000 is owing to the water fund by the general fund, and on which the water fund has to pay interest for the time, having borrowed that sum to tide over.

—The Continental Filter Company, of New York, has closed a contract with the Vincennes Water Supply Company, of Vincennes, Ind., for a large filter plant, to consist of ten filtering and settling tanks, each filter being of half a million gallons' capacity per twenty-four hours. The plant will embody the Continental Company's complete system of sedimentation and coagulation, and will be constructed and operated in conformity with the results shown by the recent experiments made at Louisville, Ky., and Cincinnati, Ohio.

LEAGUE OF AMERICAN MUNICIPALITIES

An Appeal for New Members.

Twenty-seven mayors of prominent cities have joined in sending out the following letter to mayors of cities that have not yet become members of the League:

Dear Sir—As mayors of cities which have belonged to the League of American Municipalities since its organization, we want to assure you that our experience with the association has been highly satisfactory. We are convinced that this league is the proper medium through which to bring about improved service in all municipal departments, and that every progressive city should enjoy the many advantages of membership in it. The membership of a city carries with it individual membership for every department head and every council member of that city. We know from experience that the league accomplishes these important results:

First—Through its annual conventions it brings out interesting and valuable discussions of municipal questions by competent speakers of experience in municipal administration.

Second—Through its permanent bureau of information in New York city it provides to all inquiring members at any time statistical and other information on all subjects relative to municipal affairs.

Third—It brings the municipalities of this country into a powerful union for their mutual protection and advancement.

We have joined in sending this letter to you for the purpose of impressing you with the importance of the league and its work, and of urging you to have your city take membership. We believe that every patriotic municipality should take its share in this work of inducing better city government throughout the country. We know that you and your associates in your city government will find membership in the league a great aid in your endeavors to provide for your people the best of municipal service. As it has helped us, so it will help you.

There are over one hundred cities in the league at present and new members are being added constantly. We hope soon to see every important municipality in the United States enrolled.

The letter bears the signatures of the following mayors: Samuel L. Black, Columbus; William C. Maybury, Detroit; Thomas P. Taylor, Bridgeport; Charles S. Ashley, New Bedford; John Mac Vicar, Des Moines; J. Adger Smyth, Charleston; Thomas Taggart, Indianapolis; S. M. Jones, Toledo; Edward Hoos, Jersey City; Welling G. Sickell, Trenton; Henry C. McLearn, Wilmington, Del.; Frank V. Evans, Birmingham; Raymond D. Knight, Jacksonville; Henry Truelson, Duluth; Robert J. Saltsman, Erie; J. A. Johnson, Fargo; James K. McGuire, Syracuse; F. B. Farnsworth, New Haven; James Gray, Minneapolis; T. S. McMurray, Denver; E. D. Olmstead, Spokane; J. J. Williams, Memphis; R. H. Dudley, Nashville; George R. Perry, Grand Rapids; P. J. Kirschner, St. Joseph; William B. Baum, Saginaw; John Warner, Peoria.

Notice to City Clerks.

City clerks of municipalities belonging to the League are requested to send to Secretary Gilkison the names of all officials elected or appointed in their respective cities during the past six months, in order that they may be placed on the League membership and mailing books. Individual membership cards will be issued to all new officials, also. Clerks will oblige the secretary by sending him new manuals as soon as printed.

Telephone Rates in Cities.

ATLANTA, GA.

Business places: Grounded circuit, one on wire, \$60 per annum, two on one wire, \$50 per annum each. Metallic circuit, (one mile radius), add 50 per cent. to above rates.

Residences: Grounded circuits, single wire, \$50 per annum. If subscriber has a station at place of business, \$40 per annum. Party wires, four on one wire, \$30 each per annum; three on one wire, \$33 each per annum; two on one wire, \$38 each per annum. Metallic circuit, add 50 per cent. to above rates. One company doing business.

BRIDGEPORT, CONN.

Public wires: For residences within a half mile of central office, \$36 per annum. For business places within a half mile of central office, \$72 per year. For each additional half mile from central office, add \$2 per year.

Private wires: For residences within a half mile of central office, \$48 per year. For business places within a half mile of central office, \$120. For each additional half mile from central office, add \$10 a year. Only one company.

BINGHAMTON, N. Y.

Charges for telephone service are made on a measured service basis, ranging from \$12 per annum upward, according to the number of messages sent and received. Only one company doing business.

CLEVELAND, OHIO.

The Cleveland (Bell) Telephone Company charges \$120 per year for business service and from \$60 to \$100 per year for residence service.

The Home Telephone Company charges \$48 per year for business and \$36 for residence places.

COLUMBUS, OHIO.

The rentals range from \$45 to \$90 per annum for single service wire. Only one company doing business.

DULUTH, MINN.

Telephone charges are \$50 per year for both business and residence service. Only one company doing business.

DES MOINES, IA.

There are two telephone companies in Des Moines; the Iowa (Bell) and the Mutual Telephone Company. The latter has been in operation over one year and is a success financially and otherwise. Its rates are as follows: To stockholders for private residences, \$18 per year; and for business houses, \$24 per year. To other subscribers, \$24 and \$30 respectively. The Iowa Telephone Company's rates previous to the introduction of the Mutual system were \$6 per year for private residences and \$48 to \$54 for business houses. Mayor Mac Vicar states that the Iowa Telephone Company are now charging whatever rates will secure them a subscriber.

DUBUQUE, IA.

Business houses, \$42 per year. Residences, \$30 per year. A reduction of 50 cents per month is given if bills are paid before the 10th of the first month of each quarter. Only one company doing business.

ERIE, PA.

The Bell Telephone Co. charges \$75 per annum for business houses and \$50

per annum for residences. The Mutual Telephone Co. charges \$40 for business houses and \$28 for residences.

EAST ST. LOUIS, ILL.

The general telephone rental charged in the city is \$50 per annum; with St. Louis connections, \$100 per annum. With long distance attachment, \$150 per annum. Only one company doing business.

FARGO, N. D.

For business houses, \$3 per month; for residences, \$2 per month. Long distance telephone, \$2.50 extra.

GRAND RAPIDS, MICH.

The Bell Telephone Co. charges a maximum rate of \$50 for both business houses and residences. The Citizens' Telephone Co. charges \$36 per year for business houses and \$24 per year for residences.

HUDSON, N. Y.

For both business and residence service, \$3 per month. Where more than one telephone is taken by the same party, the rate is \$2.50 per month.

INDIANAPOLIS, IND.

Business houses: Copper metallic circuit, with long distance equipment, \$72, \$60, \$40 and \$36 per annum.

Residences: Copper metallic circuit, with long distance equipment, \$54, \$36, \$30, \$25 and \$18 per annum.

MINNEAPOLIS, MINN.

Business purposes: Three on one wire, \$4 per month; two on one wire, \$5 per month; special line, \$6 per month; within one mile of exchange. Fifty cents per month added for each additional half mile.

Residence purposes: Three on one wire, \$3 per month; two on one wire, \$4 per month; special line, \$5 per month; within one mile of exchange. Fifty cents per month added for each additional half mile. From \$1 to \$4 extra is charged for long distance metallic circuits.

MACON, GA.

Business houses, \$45 per year. Residences, \$34 per year. Only one company doing business.

MOLINE, ILL.

Business houses: Special line, \$48 per year; party lines, \$30 per year.

Residence: Special line, \$30 per year; party lines, \$24 per year. \$18 per year extra is charged for long distance equipment. Only one company doing business.

NASHVILLE, TENN.

Business houses: \$66 per year. Residences: \$48 per year. \$24 per year extra for long distance equipment. Only one company doing business.

NEW BEDFORD, MASS.

Business houses: Special line, \$84 per year; party line, \$72 per year; limited line, \$48 per year.

Residences: Unlimited, \$48 per year; limited, \$36 per year. Long distance metallic circuit, \$120 per year for cabinet set, \$100 per year for wall set. Only one company doing business.

NIAGARA FALLS, N. Y.

Business houses: Long distance and single line, \$70 per year. Common instruments and party line, \$50 per year.

Residences: Single line, \$42 per year;

party line, \$33 per year. Only one company doing business.

PITTSBURGH, PA.

The general telephone rental is \$1.00 per year for unrestricted service to subscribers within a radius of a mile from central station and a proportionate rate for additional mileage. There is also a schedule of rates for measured service, ranging from \$60 per six hundred calls per year upward for party lines and from \$90 per eight hundred calls per year upward for special lines. Only one company doing business.

PHILADELPHIA, PA.

Ordinary telephone, \$84 per annum; long distance telephone, \$125 per year. There is also a measured service schedule. Only one company doing business.

PROVIDENCE, R. I.

Business houses: \$60 per year for grounded circuit within one half-mile of central office; \$6 per year added for each additional half-mile. \$120 per year for long distance service within one half-mile of central office, \$20 per year added for each additional half-mile.

Residences: \$48 per year for grounded circuit within half-mile of central office; \$6 added for each additional half-mile. \$100 per year for long distance telephone. Only one company doing business.

PAWTUCKET, R. I.

Sixty dollars per year for ordinary telephones; \$120 per year for long distance telephones. Only one company doing business.

PANA, ILL.

Business houses: \$2 per month. Residences: \$1.50 per month. Only one company doing business.

ROANOKE, VA.

The Bell Telephone Co. charges \$30 per year for long distance telephones. Inter-State Telephone & Telegraph Co. charges \$30 per year for business houses and \$18 per year for residences.

SPOKANE, WASH.

Business houses: \$6 per month. Private residences: On single lines, \$4 per month; on party lines, \$2.50 per month. Only one company doing business.

TRENTON, N. J.

Business houses: \$30 per year. Residences: \$24 per year. Two companies.

TROY, N. Y.

Business houses: \$54 per year. Only one company doing business.

UTICA, N. Y.

Business houses: \$40 to \$48 per year. Residences: \$33 to \$36 per year. Long distance metallic circuit, \$80 per year.

WILMINGTON, DEL.

Business houses: \$36 per year. Residences: \$25 per year. Two companies.

Tribute to Mayor Taylor.

Treasurer Taylor will retire from the office of mayor of Bridgeport, Conn., on May 1. He declined to be a candidate for re-election, although he could have had the Republican nomination for the asking. In a recent issue the Bridgeport "Telegram" paid Mayor Taylor the following tribute:

During the two years Thomas P. Taylor has served as mayor of Bridgeport, he has made hundreds of friends. All the world loves a fighter, and Mayor Taylor is a good fighter. He has stood as the Roosevelt in local politics, and his administration has been above suspicion.

In the conduct of his office, Mayor Taylor has found his own party arrayed against him in many matters, but he has recognized no machine rule and has sailed the course mapped out by the compass of conviction. The world honors such a man. The opportunity for corruption in politics offers itself in cities the size of Bridgeport, but no man can honestly say that Thomas P. Taylor has been a party to questionable transactions, or that he has failed to conduct the affairs of his office in a fearless manner, calculated to work to the best interests of this city.

No smirch will attach itself to Thomas P. Taylor's record when he steps down and out of the mayor's chair. His political skirts will be free from marks of discredit, and he will retire with the well wishes of those who admire one who transacted the affairs of office with the same fidelity he would his own private business, and we all know that Mayor Taylor is a successful business man.

Mayor Taylor will be succeeded by a man of his own party, Hugh Stirling, who defeated the Democratic nominee by a good majority.

DEPARTMENT OF INQUIRY.

The editor of CITY GOVERNMENT will undertake to furnish, through this department, replies to all inquiries pertaining to municipal affairs sent in by subscribers. The names of inquirers will not be published in any case.

How to Prevent Smoke Nuisance.

What law, if any, is there that enables New York city to suppress smoke; or is it a mere regulation of the health department or a city ordinance?

New York city is kept almost absolutely free from the smoke nuisance. This condition is made possible by the strict enforcement, by the Board of Health, of section 134 of the Sanitary Code, which says:

Section 134. That the owners, lessees, tenants, and managers of every blacksmith or other shop, forge, coal yard, foundry, manufactory, and premises where any business is done, or in or upon which an engine or boilers, are used, shall cause all ashes, cinders, rubbish, dirt, and refuse, to be removed to some proper place, so that the same shall not accumulate at any of the above mentioned premises, or in the appurtenances thereof, nor the same become filthy or offensive. Nor shall any smoke, cinders, dust, gas, steam, or offensive odor, be allowed to escape from any such building, place or premises, to the detriment or annoyance of any person not being therein of thereupon engaged, and that every furnace employed in the working of engines by steam, or in any mill, factory, printing house, dye factory, iron foundry, glass house, distillery, brew house, sugar refinery, bake house, gas works, or in any other buildings, used for the purposes of trade or manufacture shall be so constructed as to consume or burn the smoke arising therefrom, unless a permit to the contrary be obtained from this department.

In any case where offensive smoke arises from any furnace the proprietor of the plant is promptly indicted on the charge of maintaining a nuisance, the indictment being based on the section of the Sanitary Code specified above. Recently 20 indictments have been returned on account of smoke nuisances; two of the cases have been tried, in both of which convictions were secured and fines imposed. There is no law requiring the use of smoke consumers or prohibiting the use of soft coal. The Board

of Health states that in most plants the smoke is consumed by the injection of steam, in the proper manner, at the proper height over the firing bed, and at a proper distance from the bridge wall. The application of this method of consuming smoke varies according to the construction of the various plants, but any competent engineer can properly apply the steam to his plant. Soft coal is used extensively in New York city and the saving it's use makes is more than enough to compensate for the expense of consuming the smoke by the injection of steam.

Belgian Block or Brick Paving?

This inquiry comes from a city of 25,000 population: There is a controversy here as to whether Belgian blocks or vitrified brick should be used for paving our main street; which would be preferable?

We have consulted several expert engineers on the question of whether Belgian block or vitrified brick would be the better for street paving in your city. They agree that vitrified brick would give you the best pavement in every respect, provided, of course, you used a good paving brick. None of the engineers consulted by us know of a good paving brick manufactured in your locality, but these bricks may be obtained from Ohio, Illinois or New York state. The engineers state most positively that the brick should be of first class quality and should be laid on a 6-inch foundation of concrete. Belgian blocks have been very satisfactory for paving in New York city and their use here has been discontinued. The principal objection is that they wear smooth and do not provide good foot hold for horses.

Best Paving for Viaducts.

What is the best kind of paving on viaducts?

On viaducts with a grade of 1 per cent. or less, sheet asphalt on bituminous concrete; on viaducts of a grade of from 1 to 2½ per cent., asphalt blocks, 4x4x12 inches, on bituminous concrete; on viaducts with a grade exceeding 1 per cent. and upon which there is heavy trucking, specification granite on concrete. Bituminous and not hydraulic concrete should be used on all viaduct work. This concrete foundation to be laid on the buckle plates of the viaduct to a thickness of about two inches at the crown of the buckle plate. This sort of paving has given the best of satisfaction in the city of New York and other places where there are a large number of viaducts.

WILLIAM R. HILL, OF SYRACUSE.

William R. Hill, chief engineer and superintendent of the Syracuse water works and first vice president of the American Water Works Association, although only forty-four years of age, has had an experience in engineering work covering a period of about twenty-eight years. Furthermore, most of this experience has been with work of the utmost importance, requiring unusual skill and learning as a civil engineer. Mr. Hill was educated at Tremont Seminary, Norristown, Pa., and his first work was in 1871, when he acted as a rodman on

the surveys during the construction of the Westchester avenue and Mamaroneck avenue boulevards in Westchester county, N. Y. He was afterward engaged on the location of the Boston, Housatonic and Northern R. R., which was a projected line from New York city to Danbury, Conn. Leaving that work, he went to Brooklyn, where he was engaged on surveys for the Brooklyn Steam Transit Railway, which was the first projected elevated railroad for that city.

About the year 1874 he went with the New York Central and Hudson R. R. Co., and had charge of building the retaining walls, bridges, etc., on Fourth avenue, from 115th street to the Harlem river. He at that time, while having responsible charge of this work, was 20 years of age.

After that, Mr. Hill was employed on the construction of the New York and Manhattan Beach Railway, from Bay Ridge to Coney Island. Later on, he was employed as engineer and superintendent for the contractors during the construction of the Riverside drive, New York. After that work he was employed on the surveys and construction of the elevated railroads in New York city.

He was then employed, first as draughtsman, then as engineer, by the Boston, Hoosic Tunnel and Western railway, having charge of building depots, round houses, watering stations, etc., and also had charge of the construction of the Saratoga division of that line.

He then went to Pennsylvania, where he had charge of an engineering party making extensive topographical surveys and locating the South Pennsylvania railroad through the western ridges of the Alleghany Mountains in Westmoreland and Fayette counties.

Returning to New York city, Mr. Hill was employed by the Suburban Rapid Transit Railway Company, having charge of construction of machine shops, car sheds, track laying, etc. He then returned to Brooklyn, where he had charge of the erection of the superstructure, track laying, and equipping of the Third avenue branch of the Union Elevated railroad.

Mr. Hill was first employed by the city of Syracuse in the year 1888. He had charge of making the preliminary surveys, estimates, and selecting the source of a water supply for that city, under the direction of J. J. R. Croes, C. E. At the commencement of the work of construction Mr. Hill was appointed chief engineer. These works have been very thoroughly and substantially built at a cost of about \$4,000,000. In addition to his duties as chief engineer, in the year 1894 Mr. Hill was appointed superintendent.

Mr. Hill is a member of the American Society of Civil Engineers, who have honored him with a diploma for having presented, in the year 1895, the best paper describing, in detail, accomplished works of construction. The title of this paper is "The Water Works of Syracuse, N. Y."

At the last annual meeting of the American Water Works Association, held in Buffalo, N. Y., Mr. Hill was elected first vice president. The New England Water Works Association has changed its constitution in order to accept Mr. Hill's invitation to the association to hold its next convention (September 13, 14 and 15), in the city of Syracuse. This is the first time that it will hold a meeting outside of the New England states.

SPRINKLING WAGONS AND CARS.

It is the desire of municipal officers, especially those having charge of streets, to provide for the proper care of the roadways, and when the matter of sprinkling is considered, it is not only advisable, but imperative that the best appliances for this work be used. For the sprinkling of well paved streets, especially asphalt and brick, it is necessary that the water be put on perfectly even and lightly. The modern sprinkler is a very great improvement over the old-fashioned carts, but whether city streets should be sprinkled by wagons drawn by horses or by electric trolley sprinkling cars must be decided by the local conditions.

The Miller-Knoblock Company, South Bend, Ind., furnish either wagon sprinklers of any capacity or electric car sprinklers for any class of work. The Miller patent wagon sprinkler is too well known to need any references. The electric sprinkling car has proven its efficiency. The company would be glad to have correspondence with city officers who are interested in street sprinkling, and inquiry made of the company at South Bend, Ind., would be promptly attended to.

STREET SPRINKLING AT CAMBRIDGE.

For a number of years it has been the custom of the street department of Cambridge, Mass., when preparing for the summer's work, to advertise for bids and employ contractors who furnish watering carts, horses, harnesses and men for the purpose of sprinkling the streets during the warm weather. These contracts have always been given to the lowest bidders, but the character of the equipment and of the service rendered by the contractors has not been, in many cases, satisfactory.

In the past contractors who took a decided interest in their work and who furnished horses and harnesses and employed good, temperate and intelligent men, were crowded out by irresponsible parties who took the contracts merely as a matter of speculation, not knowing whether they could possibly do so or not, and who very seldom bid high enough to pay for the cost of feeding their horses and paying their employees in a decent manner.

In order to avoid a repetition of the above and also to insure a better service it is proposed, as an experiment, which bids fair to be successful, to fix a certain price, \$75 per month, for the use of a cart, horses and men, assigning one cart to each contractor and making the contract for one month only, which will give the superintendent of streets a chance to get rid of all unsatisfactory parties at the end of a month, and also insure better service.

STREET CLEANING COST LIMITED.

According to the appropriation act, the cost of street cleaning in the city of Washington, D. C., this year must not exceed 22 cents per thousand square yards. As the law requires the contractors to pay their laborers \$1.25 a day, it is claimed by the present contractors that the work cannot be done by them at the figure stipulated, and it is possible, therefore, that most of the street cleaning may be done by the district. According to the reports of Warner Stutler, superintendent of street and alley cleaning, the work which has been done during the past year by the district has cost but 20 cents per thousand square yards.

SPLENDID STREET SWEEPING MACHINE.

The Charlton street sweeper is constructed mainly upon the same principles as an ordinary side sweeper, excepting that it operates from curb to centre, thus giving it right of way over other vehicles on the street. Its distinctive feature, however, is its mechanism for picking up the dirt and taking it along with it. This consists of a hollow wheel on the left of the frame, five feet ten inches in diameter, the outside of which is an ordinary wheel with hub and spokes, covered on the inside of spokes with sheet iron. The inside wheel consists simply of felly without spokes, and joined to the outside wheel with bolts, the two wheels being ten inches apart and covered over with sheet iron, thus forming a hollow wheel; inside of this hollow wheel and securely bolted and riveted to the sheet iron are a series of cleats or buckets, two and a half to three inches in depth, which serve to carry the dirt from end of broom to the top of the wheel, whence it gravitates through the chute into the receptacle. The fellys which form the inside wheel are beveled, and attached to same is a rubber flange extending around the wheel and flaring outwardly eight inches; this flange, as it comes in contact with the ground, flattens out and forms a pan or flat surface, over which the end of the broom projects, thus allowing the dirt to pass from the ground into the wheel. The broom is hung diagonally to the frame, and its backward rotary action sweeps the dirt forward and sidewise—as in an ordinary side sweeper—into the wheel, as above described, instead of leaving it on the street; in this respect lies the chief merit of the Charlton sweeper.

This sweeper is manufactured in three sizes, No. 1, large size for two horses and No. 2, for single horse and No. 3, a small hand sweeper, which is especially intended for light sweeping. The hand sweeper is easily operated by one man on asphalt, and is adapted to picking up "droppings," etc. A splendid adjunct to large sweeper. The two horse sweeper is capable of cleaning 50,000 square yards in ten hours, requiring only one man with good team. It thoroughly cleans the gutter, and does away with a large force of men, necessary in the ordinary method of sweeping.

HIGHER PAVING FIGURES AT SAGINAW.

Bids on this season's paving work were recently opened at Saginaw, Mich., and found to be in excess of the figures obtained last year. The Barber company's bids on asphalt work, which were the lowest, ranged from \$1.70 to \$1.89 per square yard, while this company last year took the contracts at \$1.27 and \$1.33. The guarantee period, it should be explained, has been changed from five to ten years, and this accounts for the advance in prices.

MUNICIPAL LIGHTS AT LOW COST.

The electric light plant for street lighting at Bloomington, Ill., is owned by the city, and is conducted upon a most economical basis. The cost per light, for 310 lights of 2,000 c. p., for an all night and every night service, is \$54.20 per year. Soft coal, which is used in generating power, costs \$1.60 per ton.

—The voters of Wykoff, Minn., at a recent election, decided to establish a water works plant.

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CAMDEN, N. J.
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PLEASE MENTION CITY GOVERNMENT IN WRITING.

ALARM SYSTEMS, FIRE AND POLICE.

Gamewell Fire Alarm Telegraph Co., 19 Barclay St., New York.

ASPHALT.

Alcatraz Co., San Francisco and New York.

Assyrian Asphalt Co., Chicago.

Columbia Construction Co., Syracuse, N. Y.

Campagne Generale Des Asphaltes de France, 32 Broadway, New York.

BONDS.

Rudolph Kleybolte & Co., New York.

BAG CARRIERS.

F. C. Austin Mfg. Co., Harvey, Ill.

Thornton N. Motley Co., 43 John St., New York.

BOILERS.

The Murray Iron Works Co., Burlington, Iowa.

BOILER COMPOUND.

Boogher Boiler Compound Co., 220 Broadway, New York.

BRIDGES.

The La Fayette Bridge Co., 80 Perin Building, Cleveland, O.

CEMENT.

Atlas Cement Co., 143 Liberty St., New York.

Assyrian Asphalt Co., Chicago.

Buckeye Portland Cement Co., Bellefontaine, Ohio.

CHEMICAL ENGINES.

A. W. Dolfini & Co., 140 Nassau St., New York.

Fire Extinguisher Mfg. Co., 325 S. Desplaines St., Chicago, Ill.

CIVIL AND CONSULTING ENGINEERS

J. T. Fanning, 330 Hennepin Ave., Minneapolis, Minn.

Alexander Potter, 137 Broadway, New York.

Wise & Watson, Passaic, N. J.

CONTRACTORS.

Assyrian Asphalt Co., Chicago.

J. H. Esson, Chicago.

COUPLINGS, HOSE.

The W. J. Clark Co., Salem, Ohio.

DAMP COURSE.

Assyrian Asphalt Co., Chicago.

ENGINES.

The Murray Iron Works Co., Burlington, Iowa.

FILLER, ASPHALT.

Assyrian Asphalt Co., Chicago.

FIRE APPARATUS.

E. Howard Browne, 105 Reade St., New York.

A. W. Dolfini & Co., 140 Nassau St., New York.

Fire Extinguisher Mfg. Co., 325 S. Desplaines St., Chicago, Ill.

Seagrave & Co., Columbus, Ohio.

FIRE EXTINGUISHERS.

Fire Extinguisher Mfg. Co., Chicago.

FIRE FELT COVERING.

H. W. Johns Mfg. Co., 100 William St., New York.

FIRE HOSE.

Gutta Percha Rubber Co., New York.

E. Howard Browne, 105 Reade St., New York.

Fabric Fire Hose Co., 68 Murray St., New York.

New Jersey Car Spring and Rubber Co., Jersey City, N. J.

New York Belting & Packing Co., 25 Park Place, New York.

Peerless Rubber Mfg. Co., 16 Warren St., New York.

Manhattan Rubber Mfg. Co., 18 Vesey St., New York.

Tate & Co., Chicago.

FIREMEN'S HATS.

A. W. Dolfini & Co., 140 Nassau St., New York.

John Olson, 183 Grand St., New York.

A. Wilson, 135 Bowery, New York.

FLOORS, ASPHALT.

Assyrian Asphalt Co., Chicago.

FLUSH TANKS.

Pacific Flush Tank Co., Chicago, Ill.

FOUNTAINS, PARK AND LAWN.

J. L. Mott Iron Works, 84-90 Beekman St., New York.

GARBAGE FURNACES.

Henry W. Atwater, 72 Imperial Bldg., Montreal, Canada.

Dixon Garbage Crematory Co., Toledo, O.

GULLY CLEANERS.

Henry W. Atwater, 72 Imperial Bldg., Montreal, Canada.

INSULATED WIRES AND CABLES.

Montauk Multiphase Cable Co., 100 Broadway, New York.

Okonite Co., 253 Broadway, New York.

IRON WORK.

J. L. Mott Iron Works, 84-90 Beekman St., New York.

MAIL CHUTES.

Cutler Mfg. Co., Rochester, N. Y.

MASTIC.

Assyrian Asphalt Co., Chicago.

METER TESTING APPARATUS.

Pittsburg Meter Co., East Pittsburg, Pa.

NOZZLES.

Henry W. Atwater, 72 Imperial Bldg., Montreal, Canada.

A. W. Dolfini & Co., 140 Nassau St., New York.

Fire Extinguisher Mfg. Co., 325 S. Desplaines St., Chicago, Ill.

New Jersey Car Spring and Rubber Co., Jersey City, N. J.

PAINTS, GRAPHITE.

Jos. Dixon Crucible Co., Jersey City, N. J.

PAINTS, ASPHALT.

Assyrian Asphalt Co., Chicago.

PIPE, SEWER AND CULVERT.

H. Stevens' Sons Co., Macon, Ga.

PIPE COATINGS, HOT.

Assyrian Asphalt Co., Chicago.

PUMPS, CONTRACTORS' DRAINAGE AND SEWERAGE.

Edson Mfg. Co., 132 Commercial St., Boston, Mass.

Maslins, 165-197 First St., Jersey City, N. J.

ROAD MACHINES.

O. S. Kelly Co., Springfield, Ohio.

F. C. Austin Mfg. Co., Harvey, Ill.

Austin & Western Co., Ltd., Chicago, Ill.

RUBBER TIRES.

The Rubber Tire Wheel Co., Springfield, O.

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American Fire Engine Co., Seneca Falls, N. Y., and Cincinnati, O.

La France Fire Engine Co., Elmira, N. Y.

Manchester Locomotive Works, 40 Water St., Boston, Mass.

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Thornton N. Motley Co., 43 John St., New York.

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The Improved Street Sweeper Co., Pittsburg, Pa.

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The city of Indianapolis has a method of collecting revenue from transient merchants which is worthy of imitation. Under the tax law of the state every merchant is assessed at the full valuation of his stock. When one of these traveling merchants strikes the town, opens for business, advertising a bankrupt stock for sale valued at \$30,000, the property is immediately assessed at that valuation and collected on the spot. Should the owner demur at paying he is assured that his goods will be levied

upon if he does not pay, which has the desired effect. This method operates largely in the benefit of the home merchant.

—The council of Centralia, Ill., has entered into a contract with the Light & Power Company of that city to furnish 2,000 candle power arc lights for the streets at a cost of \$71 per lamp per year. The contract is for a period of five years. In order to fill the contract the company will put up an entire new plant at a cost of \$14,000, and promise to have the same in operation by June 1.

—The Montauk Multiphase Cable Company are just in receipt of a large additional order from Melbourne, Australia, for their fire detective cable. A remarkable feature in connection with this cable is that at this long distance from the point of manufacture, subject to rough usage in transportation, it at once proved its superiority in all ways for the purposes designed. It was subjected to practical tests, calling out the fire brigade in ample time for the suppression of fire, receiving the endorsement of Chief Stein, and subsequently receiving the approval of the builders and architects of that city.

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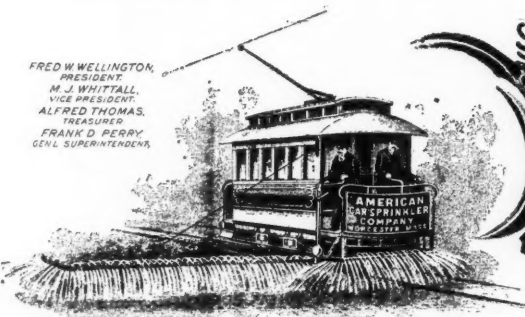
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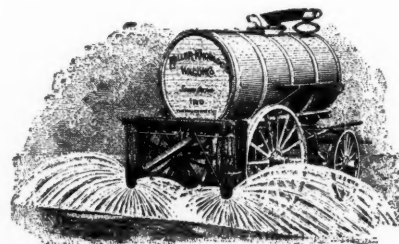
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MONARCH PICK-UP SWEEPER.

For many years back the cleaning of the thoroughfares in large cities and towns has been a question that has greatly agitated the minds of directors of municipal affairs and sanitarians of note. The medical fraternity have also been involved to a considerable degree, because of the manner in which the streets are swept and clouds of disease-breeding germs carried through the air and inhaled into the lungs of the people. Hundreds of different machines and devices to obviate all the undesirable features of the present system have been invented for this purpose, but few of them have ever demonstrated their ability to properly do the work.

Among the few successful sanitary street sweepers is one called the "Monarch," invented by two Allegheny men and now manufactured by the Improved Street Sweeper Company of Pittsburg, Pa. The "Monarch," which is a most wonderful contrivance, cleans the streets thoroughly and noiselessly. But the most

remarkable feature connected with it is that it picks up the dirt and carries it right along, thereby avoiding the piling of unsightly heaps in the gutters waiting to be gathered up and possibly to remain there for an indefinite period.

The invention resembles a huge carpet sweeper and does its work with that same precision and cleanliness that mark a parlor floor after the tidy housemaid has pushed it across its smooth surface. The contrivance is a three-wheeled affair. The third wheel is very small and is merely for a support to that part of the invention over which the driver and operator sits. Between the two large wheels is an immense cylinder in which a series of buckets are arranged. These are operated by gearing on the outside of the cylinder and revolve rapidly around the inner surface of the heavy sheet iron cylinder. These buckets extend the full length of the cylinder, which is about eight feet in length. The edges of the buckets closest to the cylinder are frayed with very heavy rubber. This arrangement is obviously a point when it is stated that the machine cannot possibly

become clogged up—something that has prevented other similar inventions from proving successful.

The invention in its initial tests thoroughly demonstrated its ability to pick up any obstacle in the line of small stones, brooms, heavy sticks, old shoes, tin cans, and, in fact, any of the litter usually found in the streets and gutters.

The buckets after passing to the top of the cylinder are emptied into a huge semi-circular tank around which they revolve. After emptying their loads they pass on down and scoop up another from the constantly accumulating pile that is being swept into a receiving bin by an immense steel whisped broom that makes several revolutions with each turn of the machine's gearing. This broom does its work beautifully and the revolving buckets do the rest until a two-horse wagon load has been accumulated. Then by simply pressing a lever the steel broom is raised from off the ground and the operator drives away to a dump to dispose of the accumulations. This latter operation is as simple as the gathering of it. A lever is pulled and the ma-

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chine then returns empty, to go on with its work.

The machine as completed now can be increased in size to hold more than a wagon-load, but two of the present ones are capable of thoroughly cleaning eight squares of Belgian block thoroughfares and eight squares of asphalt pavement without having to be emptied.

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New Brunswick, N. J.—N. Williamsson, Rep.
East St. Louis, Ill.—M. M. Stephens, Ind.

The price to be paid is \$4,700, and the capacity of the engine is fixed by the specifications of the contract at 1,100 gallons of water per minute. This is the outcome of the test between the piston and rotary types, held a year ago at the director's request by the three gentlemen with whom he consulted yesterday. At the test the city's old piston engine, No. 4, which had done hard service for many years, came out ahead of the almost new rotary pitted against it, in spite of the fact that the piston machine had been altered and not improved in the city repair shops.

The article then goes on to state the figures which were submitted by the American Fire Engine Company, the La France Fire Engine Company, and the Amoskeag Fire Engine Company, and also that the director of public safety had written letters to the different companies requesting them to send an engine to enter into a competitive test, but that the builders had all refused to do so. The article then closes as follows:

Having failed to secure a working demonstration of the several machines, the director called his experts together yesterday, and they spent some time going over the plans and specifications submitted. As a result the director sent a letter to C. T. Silsby, treasurer of the American Fire Engine Company, in which he said:

"After a conference with the committee having had in charge the test between the engines owned by Philadelphia last year, they have concluded to approve the buying of an extra first size Metropolitan engine (piston type) which I herewith do, and ask to have it forwarded to this department as soon as possible. In purchasing this engine I desire you to make such an engine as will stand the best tests for practical use and such a one as you would send to the city of Philadelphia in the future, should your engine be ultimately adopted."

When this article was read by the La France Fire Engine Company, a communication was at once addressed to Mr. S. M. Vauclain, of the Baldwin Locomotive Works, asking him in courteous terms to inform the company of the methods which were employed in arriving at the conclusion that the American fire engine was the best for the city of Philadelphia, especially as the La France Fire Engine Company had not been notified that the committee was to select an engine, and therefore did not and could not submit models, working drawings and specifications, which they would gladly have done, and also have sent an expert to fully explain the merits of their machine.

PHILADELPHIA FIRE ENGINE CASE.

Elmira, N. Y., March 24, 1899.—The Philadelphia, Pa., "Times" of March 9th, contains the following article:

The one new fire engine which Philadelphia will put into service this year will be of the piston type. Frank M. Ritter, director of the department of public safety, after consultation yesterday with Messrs. S. M. Vauclain, of the Baldwin Locomotive Works; Clement B. Hoopes, of Hoopes & Townsend, and Coleman Sellers, the eminent engineer, decided to award the contract for the engine to the American Fire Engine Company of Seneca Falls, N. Y.

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driver, and fitted with latest device for controlling width of spread. Valves cannot clog up with dirt. Absolutely simple in construction. Send for catalogue.

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for sprinkling city streets, village, county and state highways, race tracks, speedways and boulevards. Also made in sizes suitable for sprinkling private grounds and golf links. Volume of water under complete control of

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Broadway and Prince St., New York City.

Mr. Vaucain merely replied referring the La France Fire Engine Company to Director Riter. Thereupon this company wrote to Director Riter a letter similar in tenor to that written to Mr. Vaucain, but the director has failed to reply to it, although twelve days have elapsed since the letter was written, and so ample opportunity was given for a reply.

There is no question but that the director had a right to order any engine he chose, but when he states, as he does in a letter to the American Fire Engine Company, that after a conference with his committee he concluded to buy the American engine, and that after due examination by the experts, he certainly inflicts an injury upon the reputation of this company's machines, because neither

he nor the committee have ever seen any of our modern type of piston engines, and the only La France engine (No. 4) which is in Philadelphia is of an old type not built nowadays, and which has seen fourteen years service, and which, after all, beat the modern and new rotary types of engines with which the city of Philadelphia is filled.

We would have taken no further notice of this matter had we not found that our competitors, the American Fire Engine Company, have sent broadcast over the land an article bearing on this subject, published in the Seneca Falls "Reveille" of March 17th, 1899, in which they state "that the order for the engine was given after a thorough examination of different fire engines by the most skillful and practical engineers, and in

competition with other builders." We denounce this statement as absolutely false and misleading, and written with a tendency to injure the business of this company, and with the view to place the matter in its proper light before our friends and the public, we reiterate that our modern engine was not examined by these eminent engineers, nor did they examine our models or drawings; in fact, no opportunity whatever was given to us to show our machine, nor were we asked to submit models or drawings.

In conclusion we will state that we firmly believe, and know, that the modern La France engine is the best and most powerful steam fire engine made today, and that in actual test we can easily and readily demonstrate this fact.

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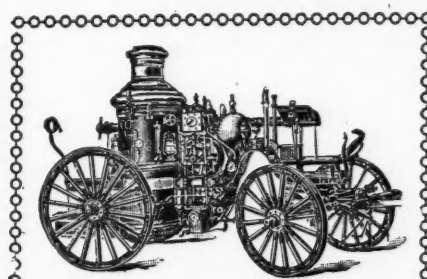
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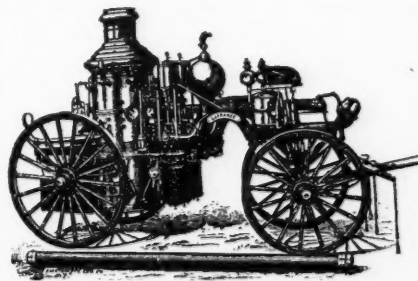
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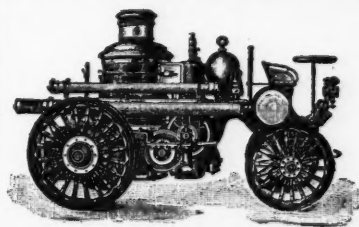
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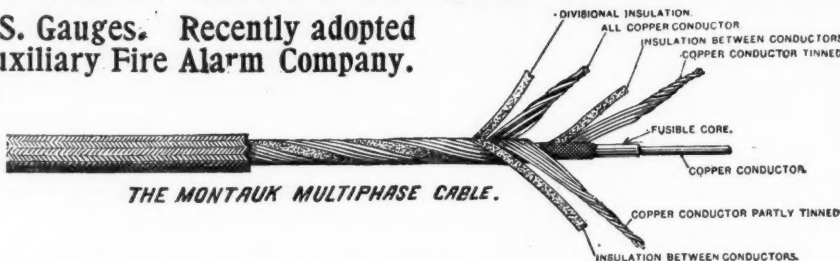
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